EXHIBIT 1

The Honorable Benjamin H. Settle

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT TACOMA

EAGLE HARBOR HOLDINGS, LLC, and MEDIUSTECH, LLC, Plaintiffs, v. FORD MOTOR COMPANY, Defendant.	Case No. 3:11-cv-05503-BHS **PLAINTIFFS' DISCLOSURE OF ASSERTED CLAIMS AND INFRINGEMENT CONTENTIONS**

Pursuant to Local Patent Rule 120 and the Court's Order dated December 6, 2011, Plaintiffs Eagle Harbor Holdings, LLC and MediusTech, LLC ("Plaintiffs") hereby provide their Disclosure of Asserted Claims and Infringement Contentions ("Plaintiffs' Disclosure").

Plaintiffs' Disclosure is based on publicly available materials regarding the accused infringing systems and acts of Ford Motor Company ("Ford") and the limited document production Ford has provided to date. Discovery in this case has just begun and, in particular, Plaintiffs have found that Ford's document production to date is incomplete in numerous respects, including its omission of documents showing how and when the infringing systems have been updated or have changed over time. Accordingly, Plaintiffs reserve the right to supplement or amend Plaintiffs' Disclosure as may be necessary based upon additional documents to be produced by Ford; documents to be produced by Ford

SUSMAN GODFREY L.L.P.
1201 Third Avenue, Suite 3800
Seattle, WA 98101-3000
Tel: (206) 516-3880; Fax: (206) 516-3883

vendors and third parties, such as Microsoft and other vendors who have provided goods or services to Ford relating to the accused systems; and additional documents, testimony, and other information to be obtained in the course of discovery.

I. Patent Rule 120(a) – Asserted Claims

Based upon the information presently available, Plaintiffs assert that Ford directly infringes or induces infringement of the following claims of the following patents (the "Asserted Claims"). Plaintiffs assert that Ford's infringement is direct, in violation of 35 U.S.C. § 271(a), unless a claim number is followed by the symbol "i" in parentheses, in which case Plaintiffs assert that Ford induces infringement of that claim, in violation of 35 U.S.C. § 271(b).

U. S. Patent No.	Asserted Claims
6,615,137	29(i)
6,629,033	13
6,778,073	1, 2, 10
7,146,260	9, 10
7,778,739	1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 15, 16, 17, 18(i), 20(i), 21(i), 22(i), 23(i), 24(i)
7,793,136	1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 15, 16, 17, 18(i), 19(i), 20(i), 21(i), 22(i), 23(i), 24(i), 28(i)
8,006,117	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 16
8,006,118	1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13(i), 15(i), 16, 33, 35, 38, 39(i)
8,006,119	1, 11, 12, 13(i), 24(i), 25(i)
8,020,028	1, 2, 3, 4, 5, 6, 9, 13, 15, 16, 17, 18(i), 19(i), 20(i), 21(i), 22(i), 23(i), 29(i), 30(i), 31
8,027,268	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 25

SUSMAN GODFREY L.L.P.
1201 Third Avenue, Suite 3800
Seattle, WA 98101-3000
Tel: (206) 516-3880; Fax: (206) 516-3883

II. Patent Rule 120(b) – Accused Systems and Methods

The Asserted Claims are asserted against the following systems, apparatuses, and devices sold now or previously by Ford (the "Accused Systems"), as well as methods practiced by a user of the Accused Systems:

a. The SYNC system installed on Ford, Lincoln, and Mercury cars and trucks, including the in-vehicle network to which the SYNC system is connected and the various processors and links in that network, including the High-Speed and/or Medium-Speed Controller Area Network ("HS-CAN" and "MS-CAN") busses. Components of the SYNC system include the Accessory Protocol Interface Module ("APIM"), the Audio Control Module ("ACM"), the connected head unit and display screens, and other connected input and/or output devices; including the processors located in those components and the Microsoft Windows Auto or Windows Automotive software and other software running on those processors.

b. The Active Park Assist system installed on Ford, Lincoln, and Mercury cars and trucks, including at least the ultrasonic, odometric, and steering sensors, as well as computers, displays, and audio outputs, involved in the operation of that system.

c. The Roll Stability Control ("RSC") system installed on Ford, Lincoln, and Mercury cars and trucks, including at least the Powertrain Control Module ("PCM"), the Anti-lock Brake System ("ABS") module, the Electronic Stability Control ("ESC") Module, Module Communications Network HS-CAN links, and the dedicated HS-CAN link between the ABS and ESC modules.

SUSMAN GODFREY L.L.P.
1201 Third Avenue, Suite 3800
Seattle, WA 98101-3000
Tel: (206) 516-3880; Fax: (206) 516-3883

III. Patent Rule 120(c) – Infringement Charts for the Asserted Claims.

Infringement Charts for each of the patents-in-suit are attached hereto as Exhibits A-K. Each chart identifies where each element of each Asserted Claim of that patent is found within the Accused Systems.

IV. Patent Rule 120(d) – Indirect Infringement.

Where Ford induces infringement, the direct infringement is performed by the users of the SYNC and Active Park Assist systems (*e.g.*, the driver of the vehicle). Ford induces infringement by SYNC and Active Park Assist users by designing and configuring the Accused Systems to operate in an infringing manner in the course of ordinary operation by the user, as described in the Infringement Charts, and/or by instructing users, through SYNC and vehicle user manuals and instructions and Ford's website, to use the SYNC and Active Park Assist systems in an infringing manner.

V. Patent Rule 120(e) – Doctrine of Equivalents.

Plaintiffs allege literal infringement by Ford and literal infringement by users of the Accused Systems that is induced by Ford. To the extent that any differences are alleged to exist between the Asserted Claims and the Accused Systems or infringing conduct, such differences are insubstantial. The Accused Systems, as configured and as used by users, perform substantially the same function, in substantially the same way, to yield substantially the same result, and therefore infringe the Asserted Claims under the doctrine of equivalents.

SUSMAN GODFREY L.L.P.
1201 Third Avenue, Suite 3800
Seattle, WA 98101-3000
Tel: (206) 516-3880; Fax: (206) 516-3883

VI. Patent Rule 120(f) – Patents Claiming Priority of Earlier Applications.

The following patents claim the priority of an earlier patent application as stated:

U.S. Patent No.	Priority Date	Based on Patent Application No.
7,778,739	April 24, 2001	09/841,915 (now U.S. Patent No. 7,146,260)
7,793,136	April 24, 2002	10/132,886 (now U.S. Patent No. 7,178,049)
8,006,117	April 24, 2002	10/132,886 (now U.S. Patent No. 7,178,049)
8,006,118	April 24, 2002	10/132,886 (now U.S. Patent No. 7,178,049)
8,006,119	April 24, 2002	10/132,886 (now U.S. Patent No. 7,178,049)
8,020,028	April 24, 2002	10/132,886 (now U.S. Patent No. 7,178,049)
8,027,268	April 24, 2001	09/841,915 (now U.S. Patent No. 7,146,260)

Dated: February 2, 2012

By:/s/ Genevieve Vose

Parker C. Folse III (WSBA No. 24895)
E-Mail: pfolse@susmangodfrey.com
Ian B. Crosby (WSBA No. 28461)
E-mail: icrosby@susmangodfrey.com
Floyd G. Short (WSBA No. 21632)
E-Mail: fshort@susmangodrey.com
Genevieve Vose (WSBA No. 38422)
E-Mail: gvose@susmangodfrey.com
Patrick C. Bageant (WSBA No. 44268)
E-Mail: pbageant@susmangodfrey.com
SUSMAN GODFREY L.L.P.
1201 3rd Avenue, Suite 3800
Seattle, WA 98101
Tel: (206) 516-3861
Fax: (206) 516-3883

Counsel for Plaintiffs

CERTIFICATE OF SERVICE

I hereby certify that on February 2, 2012, I caused the foregoing to be served upon the following by email:

Duncan E. Manville
Savitt Bruce & Willery, LLP
1425 Fourth Ave, Suite 800
Joshua Green Building
Seattle, WA 98101
dmanville@jetcitylaw.com

Wilmer Cutler Pickering Hale & Dorr LLP
60 State Street
Boston, MA 02109
michael.summersgill@wilmerhale.com
sarah.petty@wilmerhale.com

Wilmer Cutler Pickering Hale & Dorr LLP
1875 Pennsylvania Avenue NW
Washington, DC 20006
Elise.Miller@wilmerhale.com
grant.rowan@wilmerhale.com
todd.zubler@wilmerhale.com

Brooks Kushman P.C.
1000 Town Center, 22nd Floor
Southfield, MI 48075
fangilero@brookskushman.com
jleroy@brookskushman.com

/s/ Genevieve Vose
Genevieve Vose

SUSMAN GODFREY L.L.P.
1201 Third Avenue, Suite 3800
Seattle, WA 98101-3000
Tel: (206) 516-3880; Fax: (206) 516-3883

EXHIBIT 2

Exhibit A
Plaintiffs' Infringement Contentions for U.S. Patent No. 6,615,137

Subpart	6,615,137 Claim 29	Accused Instrumentality
	A method for detecting objects, comprising:	Non-limiting: The Ford Active Park Assist System utilizes a method for identifying a target parking space by means of detecting vehicles and other objects such as other vehicles, a wall, or a curb adjacent or within a potential parallel parking space, as identified below:
(a)	generating sensor data for areas around a local vehicle;	At speeds less than 30 kph ultrasonic sensors on the vehicle fascia generate data regarding areas lateral to the vehicle on the passenger side of the vehicle, as selected. Later, during parking maneuvers, forward and rear ultrasonic sensors generate data for areas in the path of the vehicle direction of travel.
(b)	identifying an object in the sensor data;	During parking space identification, the onboard computer uses information from the lateral sensors to identify a front object and a rear object defining a parking space. During the parking maneuvers, the forward and rear ultrasonic sensors also identify the objects defining the front and rear of the parking space.
(c)	determining a kinematic state for the object identified in the sensor data;	During parking space identification, the computer determines and stores relative locations each of the identified front and rear objects defining the parking space. During parking maneuvers, the onboard computer repeatedly checks the previously recorded positions of each of the front and rear objects defining the parking space.
(d)	determining a kinematic state for the local vehicle;	During parking space identification and parking maneuvers, the computer uses data from odometric and steering sensors to determine the position of the vehicle relative to the identified parking space and front and rear

Exhibit A
Plaintiffs' Infringement Contentions for U.S. Patent No. 6,615,137

		objects that define it.
(e)	comparing the kinematic state of the object with the kinematic state of the local vehicle;	During parking maneuvers, the computer compares the changing position of the vehicle with the calculated locations of the front and rear vehicles defining the parking space. Also during parking maneuvers, the front and rear sensors measure the distance to the front and rear vehicles defining the parking space and thereby determine their positions in comparison to that of the parking vehicle.
(f)	generating a warning indication when the comparison indicates a possible collision condition exists between the identified object and the local vehicle;	During parking maneuvers, the comparison of the position of the vehicle with the calculated positions of the front or rear objects defining the parking space causes a prompt to the operator to change direction or stop when the parking vehicle reaches the point beyond which collision with the front or rear objects becomes likely. Also during parking maneuvers, the comparison of the relative positions of the vehicle derived from the front or rear sensor data cause an audible warning indication to increases in frequency as the relative distance to the objects closes.
(g)	and generating a steering queue that provides a direction for the local vehicle to move to avoid the identified object.	The onboard computer generates a trajectory for parking in the identified space that avoids collision with the identified front and rear objects defining the space.

EXHIBIT 3

Exhibit B
Plaintiffs' Infringement Contentions for U.S. Patent No. 6,229,033

Subpart	6,229,033 Claim 13	Accused Instrumentality
	A system for a vehicle, comprising:	Non-limiting preamble: Roll Stability Control (RSC) system and related components in Ford, Lincoln, and Mercury vehicles as specified below.
(a)	multiple processors in the vehicle operating multiple individual software applications;	RSC equipped vehicles include processors in multiple control modules, including at least the Powertrain Control Module (PCM), the Anti-lock Brake System (ABS) module, and the Electronic Stability Control (ESC) Module, that operate multiple individual software controller applications.
(b)	multiple links connecting the multiple processors together;	The ABS module is connected to the PCM module by a Module Communications Network having multiple links, and to the ESC Module by a separate, dedicated Car Area Network (CAN) bus link.
(c)	and the multiple processors in the vehicle each operating a communication system that includes individual priority managers associated with the individual software applications, the individual priority managers attaching priority labels to individual messages transferred between individual software applications in the vehicle, the priority labels used independently by the individual priority managers to determine processing priorities for the individual messages for the individual software applications	Controller programs operating each of the identified processors operate priority managers that attach priority labels to messages transferred between software applications in the vehicle that are used to determine processing priorities for those messages at least as follows: The RSC controller application executing on a processor in the ABS module sends to at least software applications in the PCM and other software applications in the ABS Module messages including labels and/or bit flags that determine the priority of control messages. The ECS controller application executing on a processor in the ECS module sends to at least a software application in the ABS module messages including labels and/or bit flags that determine the priority of control messages. Software executing on a processor in the PCM module sends to at least a software application in the ABS module messages including labels and/or bit flags that determine the processing priorities of control messages.

EXHIBIT 4

Exhibit C
Plaintiffs' Infringement Contentions for U.S. Patent No. 6,778,073

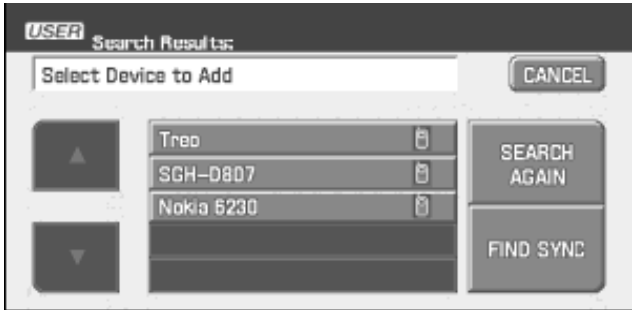
Subpart	6,778,073 Claim 1	Accused Instrumentality
	A vehicle audio system, comprising:	Non-limiting: The audio system in SYNC-equipped vehicles includes the elements identified below.
(a)	A wireless audio sensor configured to wirelessly detect different audio sources brought into or next to a vehicle and identify the detected audio sources on a display;	The SYNC Accessory Protocol Interface Module (APIM) includes a Cambridge Silicon Radio (CSR) Bluetooth (BT) transceiver or equivalent that can detect BT wireless audio sources, such as mobile phones and MP3 players, in and around the vehicle. The CSR or equivalent BT transceiver causes the detected audio sources to be displayed by conveying an identifier for each detected audio source to display software running on the Audio Control Module (ACM), as depicted in the example below: 
(b)	audio output devices for outputting audio data; and	Vehicles with the SYNC system have multiple fixed cabin speakers and, optionally, a Rear Seat Entertainment (RSE) system with wireless headphones.

Exhibit C
Plaintiffs' Infringement Contentions for U.S. Patent No. 6,778,073

(c)	a processor for selectively connecting a first one of the identified audio sources identified on the display to a first set of the audio output devices and selectively connecting a second one of the audio sources to a second set of the audio output devices.	The APIM and ACM each include a processor that selectively connects phone audio sources to a subset of vehicle speakers (e.g. front/mono) and selectively connects media player audio sources to a different set of speakers in the vehicle (e.g. all or rear).
	6,778,073 Claim 2	**Accused Instrumentality**
	A vehicle audio system according to claim 1 wherein the display is a graphical user interface that allows selection of any of the displayed different audio sources for outputting to any of the audio output devices.	See 1(a) above (graphical display allows selection of displayed audio devices).
	6,778,073 Claim 10	**Accused Instrumentality**
	A vehicle audio system, comprising:	See claim 1 above.
(a)	a wireless audio sensor configured to wirelessly detect different audio sources brought into or next to a vehicle;	See claim 1(a) above.
(b)	wireless audio output devices for outputting audio data having assigned priority values; and	See claim 1(b) above (wireless headsets in RSE equipped vehicles constitute wireless audio output devices).

Exhibit C
Plaintiffs' Infringement Contentions for U.S. Patent No. 6,778,073

		Windows Automotive platform software executing on a processor in the APIM and proprietary software executing on a processor in the ACM each assign higher priority to certain types of audio data (*e.g.*, phone voice data).
(c)	a processor for selectively connecting the different audio sources to the audio output devices according to the assigned priority values for the audio data.	See claim 1(c) above (lower priority connections are selectively connected to wireless headsets in the absence of higher priority data).

EXHIBIT 5

Exhibit D
Plaintiffs' Infringement Contentions for Patent No. 7,146,260

Subpart	7,146,260 Claim 9	Accused Instrumentality
	A multiprocessor system used in a car, comprising:	Non-limiting preamble: SYNC is a system that includes multiple processors and is used in Ford, Lincoln, and Mercury vehicles, as specified below.
(a)	multiple processors located on-board the car and adapted to run different real-time car applications;	SYNC equipped vehicles include multiple processors, including, without limitation, at least one processor in the Accessory Protocol Interface Module (APIM) and at least one processor in the Audio Control Module (ACM), as well as other processors throughout the vehicle. Multiple of these processors, including, without limitation, the at least one processor in the APIM and the at least one processor in the ACM, as well as other processors throughout the vehicle run different real-time car applications. The real-time car applications include, without limitation, those identified below (see claim 10) with respect to the APIM and ACM processors, as well as other real-time car applications executing on other processors throughout the vehicle.
(b)	different communication links coupling the multiple processors together;	At least high-speed and/or medium-speed CAN bus networks comprise links between multiple processors in SYNC-equipped vehicles.
(c)	and a dynamic configuration system run independently on multiple different ones of the multiple on-board processors that each includes	The processors on at least the APIM and ACM each run the device manager, configuration manager, and data manager constituting the dynamic configuration system.
(i)	a device manager for automatically detecting and adding new hardware devices to the on-board multiprocessor system,	A device manager is present in each of the APIM and ACM as follows: APIM: Bluetooth and USB software stacks running on a processor in the APIM that each detect and establish connections with Bluetooth or USB devices, respectively. ACM: Software executing on a processor in the ACM that receives messaging

Exhibit D
Plaintiffs' Infringement Contentions for Patent No. 7,146,260

		indicating that a Bluetooth or USB device has been connected to the vehicle and configures the ACM to interact with the device.
(ii)	a configuration manager that automatically reconfigures the multiprocessor system to run the real-time car applications on different ones of the multiple on-board processors, and	A configuration manager is present in each of the APIM and ACM as follows: APIM: Software executing on the previously identified processor in the APIM that causes appropriate software for interacting with the new hardware device to be loaded on a processor in the APIM. ACM: Software executing on the previously identified processor in the ACM that causes appropriate human-machine interface software for the new hardware device to be loaded on a processor in the ACM.
(iii)	a data manager that identifies data generated by the new devices and identifies other devices in the multiprocessor system that can input or output the identified data.	A data manager is present in each of the APIM and ACM as follows: APIM: Software code executing on the previously identified processor in the APIM that detects a data type supported by the new hardware device and establishes appropriate connections to other components for receiving or presenting the data. ACM: Software executing on the previously identified processor in the ACM that distinguishes between types of data, such as phone, music, video, contacts, music tags, album art, and other media, and identifies displays or speakers that can output the data, as well as depicts representations of such output devices on a visual display to the user.
Subpart	**7,146,260 Claim 10**	**Accused Instrumentality**
	A multiprocessor system according to claim 9 wherein the real-time car applications include any of the	See claim 9 above. The real-time car applications that run on a processor in the APIM or ACM in vehicles equipped with SYNC include audio control, video control, car sensor

	following: car braking; audio control; video control; car sensor monitoring; car display control; car security monitoring; car temperature control; car lighting control; and car airbag monitoring.	monitoring (*e.g.*, hybrid system sensors), car display control (*e.g.*, switching between display modes), and temperature control.

EXHIBIT 6

Exhibit E
Plaintiffs' Infringement Contentions for U.S. Patent No. 7,778,739

Subpart	7,778,739 Claim 1	Accused Instrumentality
	A system having multiple on-board processors configured to operate within a vehicle, comprising:	SYNC is part of a system that includes multiple processors on board a vehicle equipped with SYNC and is configured to operate within the vehicle.
(a)	one or more of the multiple on-board processors coupled together through multiple links into a multiprocessor network, wherein the multiprocessor network is configured to:	See '260 claim 9 (a) (multiple on-board processors) and (b) (multiple links).
(b)	operate a transceiver configured to detect and establish communication between at least one processor in the multiprocessor network and at least one new device brought into or next to the vehicle;	See '073 claim 1(a). CSR BT transceiver or equivalent detects and establishes communications between Freescale iMX31 or equivalent processor in the SYNC Accessory Protocol Interface Module (APIM) and a Bluetooth (BT) device brought into or next to the vehicle.
(c)	selectively connect the new device to the multiprocessor network;	Bluetooth software running on a processor in the APIM enables connection of the new device to the system. See '073 claim 1(a) (depicting interface for selecting new devices for pairing).
(d)	use a data manager to identify a particular type of data used in the new device and processed with a first software application controlled and operated by the new device;	See '260 claim 9 (c)(iii). Software executing on a processor in the APIM and/or a processor in the Audio Control Module (ACM) identifies a type of data that the BT device uses and processes with its own software. Music, voice data, and contacts are examples of data types processed by software applications on a Bluetooth-enabled mobile phone or media player.
(e)	identify a second software application from among multiple different software applications located in a memory in the	Software running on a processor in the APIM identifies the appropriate software application, which is stored in memory in the SYNC system and not yet loaded or operating in an on-board processor, and which is configured to

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Plaintiffs' Infringement Contentions for U.S. Patent No. 7,778,739

(f)	multiprocessor network, wherein the second software application is currently not loaded in or operated by any of the on-board processors, and the second software application is also configured to process the same particular type of data processed by the first software application controlled and operated by the new device;	process the data that the BT device uses and processes with its own software. Software applications for handling different data types in Windows Automotive, such as the phone core and media codecs, are implemented as modules that are dynamically loaded and executed on an as-needed basis.
(g)	Us[e] the data manager to select a particular one of the on-board processors for operating the second software application selected from the memory;	Software executing on a processor in the APIM selects one of the processors in the APIM to run the software application.
(h)	automatically move the second software application from the memory in the multiprocessor network to the particular one of the on-board processors selected by the data manager;	Software executing on a processor in the APIM automatically moves the selected software application from memory to the selected processor in the APIM.
(i)	configure the particular one of the on-board processors to run the second software application moved from the memory, wherein	Software executing on a processor in the APIM configures the selected processor in the APIM to run the selected software application.

(j)	running the second software application causes the particular one of the on-board processors to take over control and operation of the new device;	Running the selected software application causes the selected processor to take over control and operation of the BT device, for example, the phone core software controls and operates a BT phone to initiate and receive calls, or the media core software controls and operates a BT media player to select tracks to play.
(k)	and initiate transfer of the data from the new device to the particular one of the on-board processors and initiate processing of the particular type of data received from the new device with the second software application running on the particular one of the on-board processors.	Running the selected software application includes initiating transfer of data from the BT device to the selected processor as well as processing the data. For example, the phone core software causes voice data to be transferred to and processed in the APIM, or the media core software causes music data to be transferred to and processed in the APIM.
	7,778,739 Claim 2	**Accused Instrumentality**
	The system of claim 1 wherein: one of the detected new devices is a data source that generates streaming audio or video data; and the software application is configured to output the streaming audio data to an in-vehicle speaker or output the video data to a display.	See claim 1. The detected BT device can be a mobile phone and/or media player that streams audio or video data. The media core software can output streaming audio data received from the connected BT device to the in-vehicle speakers.
	7,778,739 Claim 3	**Accused Instrumentality**
	The system of claim 1	See claim 1.

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	wherein the multiprocessor network is configured to: detect a first and second one of the new devices that generate streaming audio data; disconnect the streaming audio data generated from the first one of the detected new devices currently connected [to] the speakers; and connect streaming audio data generated from the second one of the detected new devices to the speakers according to inputs received from a display coupled to the multiprocessor network.	See '073 claim 1(a) (detecting multiple BT devices that generate streaming audio data). The system is configured such that, in certain circumstances, when a user uses a human machine interface (HMI) display to choose to play audio that is being generated from a new device on in-vehicle speakers (e.g., audio from a BT phone or media player), the speakers play that audio, and the audio from the other device that was previously playing on the speakers is no longer played. For example, when a BT device is being used to play audio on in-vehicle speakers and the user chooses to use another BT device to make or receive a phone call, the audio from the first device is disconnected from in-vehicle speakers and the audio for the call is played on in-vehicle speakers.
	7,778,739 Claim 4	**Accused Instrumentality**
	The system of claim 1 wherein one of the detected new devices has an integrated display screen.	See claim 1. The BT transceiver is configured to detect mobile phones and media players having built-in display screens.
	7,778,739 Claim 5	**Accused Instrumentality**

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	The system of claim 4 wherein at least a portion of content displayed on the display screen of one of the detected new devices is communicated to a display processor in the multiprocessor network for display and generation of information on a display processor display.	See claim 4. ID3 tags, album covers, contact pictures, and other content displayed on the display screen of a connected BT device may be communicated to a processor in the system for display on the center console screen.
	7,778,739 Claim 6	**Accused Instrumentality**
	The system of claim 1 wherein one of the detected new devices includes a data storage device selected from the group of a hard disk drive, solid state device, or compact disk.	See claim 1. The BT transceiver is configured to detect mobile phones and media players that include data storage devices, such as solid state memory.
	7,778,739 Claim 9	**Accused Instrumentality**
	The system of claim 1 wherein a data storage coupled to the multiprocessor network includes a readable and writeable data storage media selected from the group of solid state device, hard disk drive, or compact disk.	See claim 6 above (solid state memory in detected mobile phones and media players may be readable and writeable).
	7,778,739 Claim 10	**Accused Instrumentality**
	The system of claim 1 wherein a display processor in the multiprocessor network is coupled to an internal car radio system.	See claim 1. The system includes a display processor coupled to an internal car radio system in the center console.

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	7,778,739 Claim 11	**Accused Instrumentality**
	The system of claim 10 wherein the car radio system receives signals from multiple RF transmitters.	See claim 10 (the internal car radio system receives signals from multiple RF transmitters).
	7,778,739 Claim 12	**Accused Instrumentality**
	The system of claim 11 wherein the car radio system is wired to internal vehicle speakers.	See claim 11 (car radio is wired to speakers).
	7,778,739 Claim 13	**Accused Instrumentality**
	The system of claim 1 wherein one of the detected new devices runs a global positioning system application.	See claim 1. The BT transceiver is configured to detect mobile phones and media players that may run a global positioning system application.
	7,778,739 Claim 15	**Accused Instrumentality**
	The system of claim 1 wherein a display in the multiprocessor network includes a user interface that includes a touch screen.	See claim 1. The system in MyFord Touch and MyLincoln Touch equipped vehicles includes a touch screen user interface display.
	7,778,739 Claim 16	**Accused Instrumentality**
	The system of claim 15 wherein the user interface initiates control operations carried out by one or more of the on-board processors in the multiprocessor networks.	See claim 1. The MyFord Touch and MyLincoln Touch touch screen interface initiates control operations carried out by the iMX31 or similar processor in the APIM, for example, when controlling a mobile phone through the phone core software or controlling a media player through the media core software.

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	7,778,739 Claim 17	**Accused Instrumentality**
	The system of claim 15 wherein the user interface generates feedback to a user of the vehicle, which feedback is derived from information displayed on the display.	See claim 15. SYNC's user interface generates various forms of visual and/or audible feedback to a user, including tones, navigation directions, alerts when a saved song is playing on a satellite radio channel, and voice recognition prompts. This feedback can be varied by changing the system's "feedback settings" by making selections using the touch screen.
	7,778,739 Claim 18	**Accused Instrumentality**
	A method for configuring multiple processors within a vehicle, comprising:	See claim 1 above. The method is performed by the user of a SYNC system, such as the driver of a SYNC equipped vehicle, because the operation of SYNC involves configuring processors in the APIM and/or the ACM.
(a)	operating the multiple processors in a multi-processor system, the multiprocessor system configured to:	See claim 1(a) above (multiple onboard processors connected by multiple links comprise a multiprocessor system). The user operates the SYNC system and thereby operates the processors in that system, which is configured as set forth in the remaining elements of the claim.
(b)	monitor for wireless signals from a new device not currently coupled to the multiprocessor system and moved into the vehicle, wherein the new device runs a first software application that processes a first type of data;	See '073 claim 1(a) (CSR BT transceiver or equivalent monitors for wireless signals from BT devices moved into a vehicle). See claim 1(d) above (BT devices may include software applications for processing different types of data).

Exhibit E
Plaintiffs' Infringement Contentions for U.S. Patent No. 7,778,739

(c)	wirelessly connect the new device to the multiprocessor system;	See claim 1(c) above (Bluetooth software running on a processor in the APIM enables wireless connection of new device to SYNC).
(d)	identify data codes in the wireless signals from the new device and use the data codes to identify the first type of data processed by the first software application running on the new device;	See claim 1(d) above. SYNC is configured to identify the type of data processed by the BT device with the appropriate software application based on a portion of the data produced by the device.
(e)	responsive to identifying the data codes from the new device, select a second software application from among multiple different software applications contained within memory in the multiprocessor system, wherein the second software application is configured to process the first type of data processed by the new device;	See claim 1(e & f) above (identifying software application stored in memory on the SYNC system that is appropriate for the type of data processed by the BT device).
(f)	download a copy of the second software application selected from the memory to a first one of the multiple processors in the multiprocessor system, wherein the second software application is not currently loaded in the first one of the multiple processors;	See claim 1(e & f) and 1(h) above. Software executing on a processor in the APIM moves and downloads the identified appropriate software application from memory to one of the processors in the APIM.

(g)	reconfigure the first one of the multiple processors in the multiprocessor system to run the second software application downloaded from the memory and take over control and operation of the new device with the second software application now running on the first one of the multiple processors; and	See claim 1(h) and (i) above. Software executing on a processor in the APIM re-configures the processor in the APIM to run the identified appropriate software application and take over control and operation of the BT device.
(h)	process[] data received from the new device with the second software application operating in and controlled by the first one of the multiple processors in the multiprocessor system in the vehicle.	See claim 1(k) above. The software application processes data from the BT device.
	7,778,739 Claim 20	**Accused Instrumentality**
	The method of claim 18 wherein the new device is a cellular telephone.	See claim 18. The BT transceiver is configured to detect mobile phones.
	7,778,739 Claim 21	**Accused Instrumentality**
	The method of claim 18 wherein the new device is an audio device that includes an integrated display screen.	See claim 18 and claim 4 above.
	7,778,739 Claim 22	**Accused Instrumentality**
	The method of claim 21 further comprising a	See claim 18 and claim 5 above.

	display in the vehicle, and communicating at least a portion of content displayed on the integrated display screen of the new device to the display in the vehicle.	
	7,778,739 Claim 23	**Accused Instrumentality**
	The method of claim 22 wherein the display in the vehicle communicates with a vehicle radio system.	See claim 18 and claim 10 above.
	7,778,739 Claim 24	**Accused Instrumentality**
	The method of claim 23 further comprising receiving at the vehicle radio system signals from multiple RF transmitters.	See claim 18 and claim 11 above.

EXHIBIT 7

Exhibit F
Plaintiffs' Infringement Contentions for U.S. Patent No. 7,793,136

Subpart	7,793,136 Claim 1	Accused Instrumentality
	An application management system for a vehicle having multiple on-board processors, comprising:	Non-limiting as to "application management system," which includes the elements identified below. SYNC-equipped vehicles have multiple on-board processors.
(a)	one or more of the multiple on-board processors coupled together into a multiprocessor system and configured to:	See '739 claim 1(a).
(b)	operate a transceiver configured to detect a new device within communication range of the multiprocessor system;	See '739 claim 1(b).
(c)	detect a protocol used by the new device;	The SYNC system detects one or more protocols used by Bluetooth enabled devices and defined in the Bluetooth standard.
(d)	configure the multiprocessor system to communicate with the new device when the protocol conforms with a protocol used in the multiprocessor system;	The SYNC system is configured to enable communication with a Bluetooth device.
(e)	identify a particular type of data used in the new device and processed with a first software application controlled and operated by the new device;	See '739 claim 1(d).
(f)	identify a second software application from among multiple different software applications located in a memory in the multiprocessor system, wherein the second software application is currently not loaded in or operated by the on-board processors in the multiprocessor system, and wherein the second software application is also configured to process	See '739 claim 1(e), (f).

	the same particular type of data processed by the first software application controlled and operated by the new device;	
(g)	select a particular one of the on-board processors for operating the second software application selected from the memory;	See '739 claim 1(g).
(h)	move the second software application from the memory in the multiprocessor system to the particular one of the on-board processors;	See '739 claim 1(h).
(i)	configure the particular one of the on-board processors to run the second software application moved from the memory, wherein running the second software application causes the particular one of the on-board processors to take over control and operation of the new device;	See '739 claim 1(i), (j).
(j)	initiate transfer of the data from the new device to the particular one of the on-board processors and initiate processing of the particular type of data received from the new device with the second software application running on the particular one of the on-board processors; and	See '739 claim 1(k).
(k)	prevent at least one of an unauthorized device, unauthorized application, or unauthorized data from accessing at least some of the software applications in the multiprocessor system.	Consistent with the Bluetooth standard, the SYNC system implements Bluetooth software that (1) requires authorization of a device in the pairing process before it can access the system, including any software applications in the system, and (2) encrypts communications between

		the system and the paired device to prevent an unauthorized device or application from accessing the system.
	7,793,136 Claim 2	**Accused Instrumentality**
	The application management system of claim 1 wherein: the detected new device is a data source that generates streaming audio or video data; and the second software application is configured to output the streaming audio data to an in-vehicle speaker or output the video data to a display.	See claim 1 above and '739 claim 2.
	7,793,136 Claim 3	**Accused Instrumentality**
	The application management system of claim 1 wherein the multiprocessor system is configured to: detect a first and second one of the new devices that generate streaming audio data; disconnect the streaming audio data generated from the first one of the detected new devices currently connected to the speakers; and connect streaming audio data generating from the second one of the detected new devices to the speakers according to the inputs received from a display coupled to the multiprocessor system.	See claim 1 above and '739 claim 3.

	7,793,136 Claim 4	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device has an integrated display screen.	See claim 1 above and '739 claim 4.
	7,793,136 Claim 5	**Accused Instrumentality**
	The application management system of claim 4 wherein at least a portion of content displayed on the display screen of the detected new device is communicated to a display processor in the multiprocessor system for display and generation of information on a display processor display.	See claim 4 above and '739 claim 5.
	7,793,136 Claim 6	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device includes a data storage device selected from the group of a hard disk drive, solid state device, or compact disk.	See claim 1 above and '739 claim 6.
	7,793,136 Claim 9	**Accused Instrumentality**
	The application management system of claim 1 wherein a data storage coupled to the multiprocessor system includes a readable and writeable data storage media selected from the group of solid state device, hard disk drive, or compact disk.	See claim 1 above and '739 claim 9.
	7,793,136 Claim 10	**Accused Instrumentality**
	The application management system of claim 1 wherein a display processor in the multiprocessor system is coupled to	See claim 1 above and '739 claim 10.

	an internal car radio system.	
	7,793,136 Claim 11	**Accused Instrumentality**
	The application management system of claim 10 wherein the car radio system receives signals from multiple RF transmitters.	See claim 10 above and '739 claim 11.
	7,793,136 Claim 12	**Accused Instrumentality**
	The application management system of claim 11 wherein the car radio system is wired to internal vehicle speakers.	See claim 11 above and '739 claim 12.
	7,793,136 Claim 13	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device runs a global positioning system application.	See claim 1 above and '739 claim 13.
	7,793,136 Claim 15	**Accused Instrumentality**
	The application management system of claim 1 wherein a display in the multiprocessor system includes a user interface that includes a touch screen.	See claim 1 above and '739 claim 15.
	7,793,136 Claim 16	**Accused Instrumentality**
	The application management system of claim 15 wherein the user interface initiates control operations carried out by one or more of the on-board processors in the multiprocessor system.	See claim 15 above and '739 claim 16.

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Plaintiffs' Infringement Contentions for U.S. Patent No. 7,793,136

	7,793,136 Claim 17	**Accused Instrumentality**
	The application management system of claim 15 wherein the user interface generates feedback to a user of the vehicle, which feedback is derived from information displayed on the display.	See claim 15 above and '739 claim 17.
	7,793,136 Claim 18	**Accused Instrumentality**
	A method for reconfiguring applications in multiple processors within a vehicle, comprising:	Non-limiting as to "a method for reconfiguring applications," which includes the elements identified below. SYNC-equipped vehicles have multiple on-board processors.
(a)	operating a wireless device manager in one of the multiple processors in a multiprocessor system, the wireless device manager configured to:	See '260 claim 9(a) (multiprocessor system), (c)(i) (BT software stack on processor in the APIM).
(i)	monitor for wireless signals from a new device not currently coupled to the multiprocessor system and moved into the vehicle, wherein the new device runs a first software application that processes a first type of data; and	See '260 claim 9(c)(i) (device manager automatically detects new devices); see also '739 claim 18(b) (monitoring for devices, wherein the new BT device contains an application for processing different types of data).
(ii)	wirelessly connect the new device to the multiprocessor system;	See '739 claim 18(c).
(b)	operating a configuration manager in one of the multiple processors in the multiprocessor system, the configuration manager configured to:	See '260 claim 9(c)(ii) (configuration manager).

(i)	monitor operations of the multiple processors in the multiprocessor system;	The Windows Automotive platform utilizes hardware watchdogs to monitor the operations of the multiple processors and identify failures.
(ii)	identify data codes in the wireless signals from the new device and use the data codes to identify the first type of data processed by the first software application running on the new device;	See '739 claim 18(d).
(iii)	responsive to identifying the data codes from the new device, select a second software application from among multiple different software applications stored within memory in the multiprocessor system, wherein the second software application is associated with the first type of data processed by the new device and is not currently loaded into a particular one of the multiple processors in the multiprocessor system;	See '739 claim 18(e), (f).
(iv)	download a copy of the second software application selected from the memory to the particular one of the multiple processors in the multiprocessor system;	See '739 claim 18(f).
(v)	reconfigure the particular one of the multiple processors in the multiprocessor system to run the second software application downloaded from the memory and take over control and operation of the new device; and	See '739 claim 18(g).
(vi)	process data from the new device with the second software application operating in and controlled by the particular one	See '739 claim 18(h).

	of the multiple processors in the multiprocessor system; and	
(c)	operating a security manager configured to determine authority to access at least some of the software applications or access vehicle data used in the multiprocessor system.	The SYNC system implements Bluetooth software that requires authorization of a device in the pairing process before it can access the system, including any software applications in the system. See also claim 1(k).
	7,793,136 Claim 19	**Accused Instrumentality**
	The method of claim 18 wherein the new device is an audio device, and further comprising receiving streaming audio data from the audio device with one of the multiple processors in the multiprocessor system.	See claim 18 above and '739 claim 2 (streaming audio data from an audio device).
	7,793,136 Claim 20	**Accused Instrumentality**
	The method of claim 18 wherein the new device is a cellular telephone.	See claim 18 above and '739 claim 20.
	7,793,136 Claim 21	**Accused Instrumentality**
	The method of claim 18 wherein the new device is an audio device that includes an integrated display screen.	See claim 18 above and '739 claim 21.
	7,793,136 Claim 22	**Accused Instrumentality**
	The method of claim 21 further comprising a display in the vehicle, and communicating at least a portion of content displayed on the integrated display screen of the new device to the display in the vehicle.	See claim 21 above and '739 claim 22.
	7,793,136 Claim 23	**Accused Instrumentality**

	The method of claim 22 wherein the display in the vehicle communicates with a vehicle radio system.	See claim 22 above and '739 claim 23.
	7,793,136 Claim 24	**Accused Instrumentality**
	The method of claim 23 further comprising receiving at the vehicle radio system signals from multiple RF transmitters.	See claim 23 above and '739 claim 24.
	7,793,136 Claim 28	**Accused Instrumentality**
	The method of claim 18 wherein the new device includes a data storage device selected from the group of a hard disk drive, solid state device, or compact disk, and further comprising wirelessly receiving data from the data storage device with one of the multiple processors in the multiprocessor system.	See claim 18 above. The SYNC system can wirelessly receive data from a data storage device, for example, calendar entries or contacts stored on BT device's solid state memory.

EXHIBIT 8

Exhibit G
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,006,117

Subpart	8,006,117[1] Claim 1	Accused Instrumentality
	A computer system, comprising:	Non-limiting preamble.
(a)	a memory;	SYNC contains flash memory.
(b)	a real-time operating system;	SYNC uses the Microsoft Auto or Automotive platform, which is a real-time operating system.
(c)	a user interface;	SYNC utilizes user interfaces such as display screens and touch screens.
(d)	one or more processors in a processing system, wherein the processing system is configured to:	See '260 claim 9(a) (multiple processors), (b) (coupled into a processing system).
(i)	operate a transceiver,	See '739 claim 1(b) (transceiver).
(ii)	detect a new device within communication range of the transceiver,	See '260 claim 9(c)(i) (detecting a device).
(iii)	detect a protocol used by the new device,	See '136 claim 1(c).
(iv)	communicate with the new device in response to the detected protocol conforming with a protocol used by the processing system;	See '136 claim 1(d).
(e)	an application management system configured to:	Non-limiting.
(i)	identify data parameters that include at least one of data codes, data type and device ID associated with the new device,	See '739 claim 1(d) (data types), '268 claim 21(f) (data codes), '268 claim 1(c) (security attribute is a device ID).

[1] Language of the claims in this chart reflects an issued Certificate of Correction.

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Plaintiffs' Infringement Contentions for U.S. Patent No. 8,006,117

(ii)	verify the new device data parameters as at least one of authorized or unauthorized; and	See '268 claim 1(d).
(iii)	responsive to verifying the data parameters as authorized, connect to the new device, dynamically configure an application to process the data types and launch the application in the processing system, wherein the application in response to launching is configured to take over control and operation of the new device including:	See '268 claim 1(e) and (f), and '739 claim 1(j) (running the software application on the processor causes the application and processor to take over control and operation of the new device).
(A)	initiating transfer of data from the new device to the operating system; and	See '739 claim 1(k) (running software application includes initiating transfer of data from the BT device to the selected processor).
(B)	initiate processing of the data received from the new device.	See '739 claim 1(k) (running software application includes processing data transferred from the BT device).
	8,006,117 Claim 2	**Accused Instrumentality**
	The computer system of claim 1 wherein the first processor in response to verifying the data parameters as unauthorized prevents the new device from accessing other software applications in the computer system.	See claim 1 and '268 claim 1(d). The APIM hardware and software is configured to use the BT device's hardware address to determine if the device has been authorized (previously paired) or not. If the device is not authorized, its applications and data cannot be processed by the distributed processing system.
	8,006,117 Claim 3	**Accused Instrumentality**
	The application management system of claim 2 wherein the processor is further configured to:	See claim 2 above.

(a)	operate the transceiver to detect a second new device that generates streaming audio data;	See '739 claim 3(a) (detecting a second device that generates streaming audio data).
(b)	disconnect the streaming audio data generated from the first new device; and	See '739 claim 3(b) (disconnecting the streaming audio from the first device).
(c)	connect the streaming audio data generated from the second new device according to a priority level set in at least one of the processors and inputs received from the user interface.	See '028 claim 3(c).
	8,006,117 Claim 4	**Accused Instrumentality**
	The application management system of claim 1 wherein the user interface comprises at least one of: an information display, a touch screen, a user operated switch, a voice responsive input, a haptic feedback, or an audio output.	See claim 1. The user interface in SYNC comprises at least an information display, touch screen, and/or voice responsive input.
	8,006,117 Claim 5	**Accused Instrumentality**
	The application management system of claim 4 wherein the user interface initiates control operations carried out by the processing system.	See claim 4. Further, see '117 claim 1(c) (SYNC user interface is the primary means for operating the system).
	8,006,117 Claim 6	**Accused Instrumentality**
	The application management system of claim 4 wherein the user interface generates feedback to a user, wherein the feedback is derived in response to selection of information displayed on the user interface.	See claim 4 and '739 claim 17. SYNC generates various forms of feedback to a user, including tones, navigation directions, and voice recognition prompts. This feedback can be varied by changing the system's feedback settings by making selections using the touch screen.

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Plaintiffs' Infringement Contentions for U.S. Patent No. 8,006,117

	8,006,117 Claim 7	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device has an integrated display screen	See claim 1 and '739 claim 4.
	8,006,117 Claim 8	**Accused Instrumentality**
	The application management system of claim 7 wherein at least a portion of content displayed on the integrated display screen is communicated to the processor for displaying on the user interface.	See claim 7 and '739 claim 5.
	8,006,117 Claim 9	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device includes a data storage device comprising at least one of a hard disk drive, solid state device, or compact disk.	See claim 1 and '739 claim 6.
	8,006,117 Claim 10	**Accused Instrumentality**
	The application management system of claim 9 wherein the processor is coupled to a readable and writeable data storage comprising at least one of a solid state device, hard disk drive, or compact disk.	See claim 9 and '739 claim 9.
	8,006,117 Claim 11	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device is connected to the processing system via a wired or wireless connection.	See claim 1, '073 claim 1(a) (BT transceiver configured to detect and connect to BT wireless audio sources), '260 claim 9(c)(i).

Exhibit G
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,006,117

	8,006,117 Claim 16	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device runs a global positioning system application.	See claim 1 and '739 claim 13.

EXHIBIT 9

Exhibit H
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,006,118

Subpart	8,006,118 Claim 1	Accused Instrumentality
	A system, comprising:	Non-limiting preamble.
(a)	multiple processors configured to operate as a distributed processing system, wherein the distributed processing system is configured to:	See '260 claim 9(a) (multiple processors). Two or more of the processors in the SYNC system operate as a distributed processing system.
(b)	use a watchdog task configured to identify a failure, wherein the failure comprises at least one of:	The Windows Automotive platform utilizes both hardware and software watchdogs.
(i)	a failed processor in the distributed processing system, a failure in communications in the distributed processing system, or a failure in a first application running on one of the processors in the distributed processing system;	The Windows Automotive watchdogs identify both failures in processors and failures in software applications.
(c)	monitor for a request, wherein the request comprises at least one of:	See '260 claim 9(c)(i) (detecting includes monitoring for requests).
(i)	a request to add a new processor, or a request to disconnect a currently connected one of the processors and replace the currently connected one of the processors with the new processor, wherein the new processor is a component within a new device not currently connected to the distributed processing system; and	See '260 claim 9(c)(i) (Bluetooth and USB software stacks receive requests to add new Bluetooth or USB devices with processors) and '739 claim 3 (disconnecting and replacing streaming audio sources).
(d)	in response to at least one of the failure identified by the watchdog task or the request, at least one of:	Bluetooth or USB software responds to the request by performing the following:

(i)	add the new device to the distributed processing system, remove the currently connected one of the processors from the distributed processing system and add the new device to the distributed processing system, or initiate a reconfiguration process configured to terminate a second application running in the distributed processing system, wherein the second application is configured to process data from the currently connected one of the processors or process data from one of the processors in the distributed processing system associated with the failure identified by the watchdog task.	In response to the request to enable connection to a new device, Bluetooth or USB software running on the APIM adds the new device to the distributed processing system, or disconnects a currently connected device and replaces it with the new device.
	8,006,118 Claim 2	**Accused Instrumentality**
	The system of claim 1, wherein the reconfiguration process is further configured to:	See claim 1 above.
(a)	identify data codes in signaling from the new processor identifying at least one of an application running on the new processor, a data type used on the new processor, or a security attribute associated with at least one of the new processor, data stored in the new processor, or the application running on the new processor;	See '268 claim 1(c) (security attribute); '739 claim 1(d) (data types), '268 claim 21(f) (data codes).
(b)	use the security attribute to prevent at least one of an unauthorized application or unauthorized data from being processed by the distributed processing system;	See '268 claim 1(d). The APIM hardware and software is configured to use the BT device's hardware address to determine if the device has been authorized (previously paired) or not. If the device is not authorized, its applications and data cannot be

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Plaintiffs' Infringement Contentions for U.S. Patent No. 8,006,118

		processed by the distributed processing system.
(c)	identify a stored application in memory accessible by the distributed processing system, wherein the stored application processes the same data type used by the new processor;	See '739 claim 1(e) and (f).
(d)	responsive to identifying the stored application, download the stored application from memory into the distributed processing system;	See '739 claim 1(h).
(e)	use the stored application to process data received from the new processor; or	See '739 claim 1(k).
(f)	select an appropriate user interface to output the data.	See '260 claim 9(c)(ii) (running appropriate human machine interface).
	8,006,118 Claim 4	**Accused Instrumentality**
	The system of claim 1, wherein the new processor is connected to the distributed processing system over a wired connection.	See claim 1 above. USB devices can be connected to the distributed processing system over a wired connection.
	8,006,118 Claim 5	**Accused Instrumentality**
	The system of claim 4, wherein the wired connection comprises a Universal Serial Bus.	See claim 4 above.
	8,006,118 Claim 6	**Accused Instrumentality**
	The system of claim 1, wherein the new processor is connected to the distributed processing system over wireless	See claim 1 above. A Bluetooth device can be connected to the distributed processing system over a wireless Bluetooth

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	Bluetooth, 802.11, satellite link, or cellular connection.	connection.
	8,006,118 Claim 7	**Accused Instrumentality**
	The system of claim 1, wherein the request is received via a user interface.	See claim 1 above. A user can request to connect to a previously-paired Bluetooth device or pair a new Bluetooth device using the display on the center console.
	8,006,118 Claim 8	**Accused Instrumentality**
	The system of claim 1, wherein the user interface comprises a visual user interface, touch screen user interface, or audio user interface.	See claim 1 and '117 claim 4.
	8,006,118 Claim 9	**Accused Instrumentality**
	The system of claim 8, wherein the visual user interface includes a display.	See claim 8 and '117 claim 1(c).
	8,006,118 Claim 10	**Accused Instrumentality**
	The system of claim 9, wherein the display is located in a dash board of a vehicle.	See claim 9 above. The Ford Sync display is located in the dash board of the vehicle.
	8,006,118 Claim 12	**Accused Instrumentality**
	The system of claim 1, wherein the distributed processing system comprises a vehicle entertainment system.	See claim 1 above. SYNC is a vehicle entertainment system.
	8,006,118 Claim 13	**Accused Instrumentality**
	The system of claim 12, wherein the at least one of the processors in the distributed processing system of the vehicle	See claim 12. One or more processors in the distributed processing system can operate in a mobile phone or music

	entertainment system operates in a cell phone or music storage device.	storage device.
	8,006,118 Claim 15	**Accused Instrumentality**
	The system of claim 1, wherein the new processor operates in a first cellular phone and the currently connected processor operates in a second cellular phone.	See claim 1 above. The new processor and the currently connected processor can both operate in mobile phones.
	8,006,118 Claim 16	**Accused Instrumentality**
	The system of claim 1, wherein the watchdog task operates in response to a timer.	See claim 1 above. The Ford SYNC software watchdog is timer-based.
	8,006,118 Claim 33	**Accused Instrumentality**
	An apparatus, comprising:	Non-limiting preamble.
(a)	a multiprocessor system configured to:	See '260 claim 9(a) (multiple processors).
(b)	monitor for a communication failure;	See claim 1(b) (hardware and software watchdogs). SYNC monitors for communication failures with connected Bluetooth devices.
(c)	monitor for a request to either add a new device to the multiprocessor system or replace a connected device currently connected to the multiprocessor system with a new device, wherein the new device is currently not connected to the multiprocessor system; and	See claim 1(c)(i) above.
(d)	responsive to the communication failure or the request:	See claim 1(d) above.

(i)	at least one of add the new device to the multiprocessor system, or remove the connected device from the multiprocessor system and add the new device to the multiprocessor system, and	See claim 1(d)(i) above.
(ii)	initiate a reconfiguration process configured to terminate an application currently running in the multiprocessor system.	Windows Automotive software watchdogs terminate applications associated with failed communications links.
	8,006,118 Claim 35	**Accused Instrumentality**
	The apparatus of claim 33, wherein the multiprocessor system is further configured to:	See claim 33 above.
(a)	identify a security attribute associated with the new device;	See '268 claim 1(c).
(b)	identify the new device as an authorized new device or an unauthorized new device according to the security attribute; and	See '268 claim 1(d).
(c)	in response to identifying the new device as the unauthorized new device, prevent data from the new device from being processed by the multiprocessor system; and	See '117 claim 2.
(d)	in response to identifying the new device as the authorized new device:	See '268 claim 1(e).
(i)	identify a stored application in a memory accessible by the multiprocessor system, wherein the stored application processes a same data type used by the new device;	See '268 claim 1(f).

(ii)	download the stored application from memory into the multiprocessor system; and	See '739 claim 1(h).
(iii)	use the stored application to process data received from the new device.	See '739 claim 1(k).
	8,006,118 Claim 38	**Accused Instrumentality**
	The apparatus of claim 33, wherein the request is generated in response to detection of a selection on a user interface.	See claims 33 and 7 above.
	8,006,118 Claim 39	**Accused Instrumentality**
	The apparatus of claim 33, wherein the new device is a cellular phone and the connected device is a cellular phone.	See claims 33 and 15 above.

EXHIBIT 10

Exhibit I
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,006,119

Subpart	8,006,119[1] Claim 1	Accused Instrumentality
	A processor apparatus, comprising:	Non-limiting preamble.
(a)	multiple processors, wherein one or more of the processors are configured to operate in a distributed processing system and configured to:	See '118 claim 1(a).
(b)	identify a new device that is not currently coupled to the processing system,	See '260 claim 9(c)(i).
(c)	connect the new device to the processing system when signaling from the new device conforms to a communication protocol used in the processing system;	See '136 claim 1(c), (d) (SYNC system detects devices communicating using one or more protocols defined in the Bluetooth standard and is configured to communicate with those devices); '739 claim 1(c) (connect the new device).
(d)	configure the new device to operate with the processing system;	The new device is configured to operate with the SYNC system. For example, upon connection, the device's user interface functions may disabled or modified – the display may go to sleep, MP3 playback may be disabled, and the user may not be able to browse in the media library on the connected device using the display of the connected device.
(e)	identify data codes in the signaling from the new device identifying an application running on the new device, a data type used on the new device, or a security attribute associated with at least one of the new device, data stored in the new device, or the application running on the new	See '118 claim 2(a).

[1] Language of the claims in this chart reflects a pending Certificate of Correction, attached to this Exhibit.

	device;	
(f)	use the identified security attribute to prevent at least one of an unauthorized application or unauthorized data from being processed by the processing system;	See '118 claim 2(b).
(g)	identify at least one stored application in memory accessible by the processor, wherein the application processes the same data type used by the new device;	See '118 claim 2(c).
(h)	responsive to identifying the stored application, download the stored application from memory into the processing system;	See '118 claim 2(d).
(i)	use the application to process data received from the new device; and	See '118 claim 2(e).
(j)	select an appropriate human machine interface to output the data.	See '118 claim 2(f).
	8,006,119 Claim 11	**Accused Instrumentality**
	The processor of claim 1 wherein the security attribute prevents a corruption by any unauthorized application or software code in the operation of at least one of: a. a task controlled by one or more of the multiple processors, and b. a task controlled by a software application.	See claim 1. By identifying a new device as authorized or unauthorized, the security attribute prevents unauthorized applications or data from being processed, which prevents unauthorized tasks from being performed in the processors or applications.
	8,006,119 Claim 12	**Accused Instrumentality**

	The processor of claim 11 wherein the security attribute allows for any two or more of the identified applications executing on the different processors to operate as one or more integrated systems.	See claim 11. Authorized devices can connect with the SYNC system. The processors on such devices and the processors in the SYNC system perform functions as an integrated system.
	8,006,119 Claim 13	**Accused Instrumentality**
	A processing method, including:	
(a)	operating a processor system, wherein a processor is coupled to at least a second processor in at least one of an autonomous processing mode or a distributed processing mode, the processor system configured to:	See '260 claim 9(a), (b) (multiple processors, coupled). Two or more of the processors in the SYNC system operate in a distributed processing mode.
(b)	identify a new device that is not currently coupled to the processor system,	See claim 1(b).
(c)	connect the new device to the processor system when signaling from the new device conforms to a communication protocol used in the processor system;	See claim 1(c).
(d)	configure the new device to operate with the processor system;	See claim 1(d).
(e)	identify data codes in the signaling from the new device identifying an application running on the new device, a data type used on the new device, or a security attribute associated with at least one of data stored in the new device or the application running on the new device;	See claim 1(e).
(f)	use the identified security attribute to prevent at least one of	See claim 1(f).

	an unauthorized application or unauthorized data from being processed by the processor system;	
(g)	identify at least one stored application in memory accessible by the processor system, wherein the application processes the same data type processed by the new device;	See claim 1(g).
(h)	responsive to identifying the stored application, download the stored application from memory into the processor system;	See claim 1(h).
(i)	use the application to process data received from the new device; and	See claim 1(i).
(j)	select an appropriate human machine interface to output the data.	See claim 1(j).
	8,006,119 Claim 24	**Accused Instrumentality**
	The processing method of claim 13 wherein the security attribute prevents a corruption by any unauthorized application or software code in the operation of at least one of: a. a task controlled by one or more of the multiple processors, and b. a task controlled by a software application.	See claims 13 and 11.
	8,006,119 Claim 25	**Accused Instrumentality**
	The processing method of claim 24 wherein the security attribute allows for any two or more of the identified	See claims 24 and 12.

	applications executing on the different processors to operate as one or more integrated systems.	

PTO/SB/44 (09-07)
Approved for use through 08/31/2013. OMB 0651-0033
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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 8,006,119

APPLICATION NO.: 12/859,103

ISSUE DATE : 8/23/2011

INVENTOR(S) : Robert Pierce Lutter

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

At column 7, line 5, please replace first instance of "processing" with –processed–.

At column 9, line 1, please replace "processor apparatus" with –processing method–.

At column 9, line 6, please replace "processor" with –processing method–.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Eagle Harbor Holdings, LLC
175 Parfitt Way SW, Suite S140
Bainbridge Island, WA 98110

12/14/2011 HVUONG2 00000008 8006119
01 FC:1811 100.00 OP

EXHIBIT 11

Exhibit J
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,020,028

Subpart	8,020,028 Claim 1	Accused Instrumentality
	An application management system for a multiprocessor system, comprising:	Non-limiting as to "application management system," which includes the elements identified below. SYNC-equipped vehicles have multiple on-board processors.
(a)	one or more processors coupled together into a multiprocessor system, wherein at least one of the processors in the multiprocessor system is configured to:	See '260 claim 9(a), (b) (multiple processors, coupled).
(b)	operate a transceiver configured to detect a new device within communication range of the multiprocessor system;	See '739 claim 1(b) (transceiver).
(c)	detect a protocol used by the new device;	See '136 claim 1(c).
(d)	configure the multiprocessor system to communicate with the new device when the protocol conforms with a protocol used in the multiprocessor system;	See '136 claim 1(d).
(e)	identify a particular type of data used in the new device and processed with a first software application controlled and operated by the new device;	See '136 claim 1(e).
(f)	identify a second software application from among multiple different software applications located in a memory in the multiprocessor system, wherein the second software application is currently not loaded in or operated by any the on board processors in the multiprocessor system, and wherein the second software application is also configured to process the same particular type of data processed by the	See '136 claim 1(f).

	first software application controlled and operated by the new device;	
(g)	download a copy of the second software application selected from the memory to one of the multiple processors in the multiprocessor system;	See '739 claim 1(h).
(h)	configure said processor to run the second software application moved from the memory, wherein running the second software application causes said processor to take over control and operation of the new device;	See '739 claim 1(i), (j).
(i)	initiate transfer of the data from the new device to said processor and initiate processing of the particular type of data received from the new device with the second software application running on said processor; and	See '739 claim 1(k).
(j)	prevent at least one of an unauthorized device, unauthorized application, or unauthorized data from accessing at least some of the software applications or data in the multiprocessor system.	See '136 claim 1(k).
	8,020,028 Claim 2	**Accused Instrumentality**
	The application management system of claim 1 wherein the multiprocessor system is further configured to monitor for at least one of a failure in an application in a newly added device, a failure in a processor in the newly added device, or a failure in a communications link with the newly added	See claim 1 above. The Windows Automotive platform uses both software and hardware watchdogs to monitor for failures in applications and processors in connected devices and for failures in communication links. For example, when a

	device.	device is removed from the system, the windows message loop detects the change in the BT Device List and starts the process of unregistering the device.
	8,020,028 Claim 3	**Accused Instrumentality**
	The application management system of claim 1 wherein the multiprocessor system is configured to:	See claim 1 above.
(a)	detect a first and second one of the new devices that generate streaming audio data;	See '739 claim 3 (a).
(b)	disconnect the streaming audio data generated from the first one of the detected new devices currently connected to the speakers; and	See '739 claim 3 (b).
(c)	connect streaming audio data generating from the second one of the detected new devices to the speakers according to at least one of a priority level set in at least one of the processors and inputs received from a display coupled to the multiprocessor system.	See '739 claim 3(c) (connecting streaming audio data from the second device according to inputs received from the user interface). The SYNC system also connects streaming audio data based on a priority level set in the processor. For example, voice data from mobile phone takes priority over audio data from a music player.
	8,020,028 Claim 4	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device has an integrated display screen.	See claim 1 and '739 claim 4.
	8,020,028 Claim 5	**Accused Instrumentality**
	The application management system of claim 4 wherein at	See claim 4 and '739 claim 5.

	least a portion of content displayed on the display screen of the detected new device is communicated to a display processor in the multiprocessor system for display and generation of information on a display processor display.	
	8,020,028 Claim 6	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device includes a data storage device selected from the group of a hard disk drive, solid state device, or compact disk.	See claim 1 and '739 claim 6.
	8,020,028 Claim 9	**Accused Instrumentality**
	The application management system of claim 1 wherein a data storage coupled to the multiprocessor system includes a readable and writeable data storage media selected from the group of solid state device, hard disk drive, or compact disk.	See claim 1 and '739 claim 9.
	8,020,028 Claim 13	**Accused Instrumentality**
	The application management system of claim 1 wherein the detected new device runs a global positioning system application.	See claim 1 and '739 claim 13.
	8,020,028 Claim 15	**Accused Instrumentality**
	The application management system of claim 1 wherein a display in the multiprocessor system includes a user interface that includes a touch screen.	See claim 1 and '739 claim 15.

	8,020,028 Claim 16	**Accused Instrumentality**
	The application management system of claim 15 wherein the user interface initiates control operations carried out by one or more of the processors in the multiprocessor system.	See claim 15 and '739 claim 16.
	8,020,028 Claim 17	**Accused Instrumentality**
	The application management system of claim 15 wherein the user interface generates feedback to a user, which feedback is derived from information displayed on the display.	See claim 15 and '739 claim 17.
	8,020,028 Claim 18	**Accused Instrumentality**
	A method for reconfiguring applications in a multiprocessor [system], comprising:	See '260 claim 9(a) (multiple processors).
	operating a wireless device manager in at least one processor in the multiprocessor system, the wireless device manager configured to:	See '136 claim 18(a).
	a. monitor for wireless signals from a new device not currently coupled to the multiprocessor system, wherein the new device runs a first software application that processes a first type of data; and	See '136 claim 18(a)(i).
	b. wirelessly connect the new device to the multiprocessor system;	See '136 claim 18(a)(ii).
	operating a configuration manager in one of the multiple processors in the multiprocessor system, the configuration	See '136 claim 18(b).

	manager configured to:	
	c. monitor operations of the multiple processors in the multiprocessor system;	See '136 claim 18(b)(i).
	d. identify data codes in the wireless signals from the new device and use the data codes to identify the first type of data processed by the first software application running on the new device;	See '136 claim 18(b)(ii).
	e. responsive to identifying the data codes from the new device, select a second software application from among multiple different software applications stored within memory in the multiprocessor system, wherein the second software application is associated with the first type of data processed by the new device and is not currently loaded into one of the multiple processors in the multiprocessor system;	See '136 claim 18(b)(iii).
	f. download a copy of the second software application selected from the memory to one of the multiple processors in the multiprocessor system;	See '136 claim 18(b)(iv).
	g. reconfigure one of the multiple processors in the multiprocessor system to run the second software application downloaded from the memory and take over control and operation of the new device; and	See '136 claim 18(b)(v).
	h. process data from the new device with the second software application operating in and controlled by the particular one of the multiple processors in the	See '136 claim 18(b)(vi).

	multiprocessor system; and	
	i. operating a security manager configured to determine authority to access at least some of the new devices, software applications or data used in the multiprocessor system.	See '136 claim 18(c).
	8,020,028 Claim 19	**Accused Instrumentality**
	The method of claim 18 wherein the new device is an audio device, and further comprising receiving streaming audio data from the audio device with one of the multiple processors in the multiprocessor system.	See claim 18 and '739 claim 2 (streaming audio data from an audio device).
	8,020,028 Claim 20	**Accused Instrumentality**
	The method of claim 18 wherein the new device is at least one of a cellular telephone, navigation system and video system.	See claim 18 and '739 claim 20. The new device can be a t least a mobile phone or media player.
	8,020,028 Claim 21	**Accused Instrumentality**
	The method of claim 18 wherein the new device is an audio device that includes an integrated display screen.	See claim 18 and '739 claim 21.
	8,020,028 Claim 22	**Accused Instrumentality**
	The method of claim 21 further comprising a display, and communicating at least a portion of content displayed on the integrated display screen of the new device to the display.	See claim 21 and '739 claim 22.
	8,020,028 Claim 23	**Accused Instrumentality**

	The method of claim 18 wherein the new device includes a data storage device selected from the group of a hard disk drive, solid state device, or compact disk, and further comprising wirelessly receiving data from the data storage device with one of the processors in the multiprocessor system.	See claim 18 and '136 claim 28.
	8,020,028 Claim 29	**Accused Instrumentality**
	The method of claim 22 further comprising:	See claim 22.
(a)	operating the device manager to monitor for wireless signals from at least a second new device not currently coupled to the multiprocessor system;	See '260 claim 9(c)(i) (device manager).
(b)	determining whether a wireless communication interface used by the second new device is compatible with at least one protocol used in the multiprocessor system;	SYNC system detects devices communicating using one or more protocols defined in the Bluetooth standard and is configured to communicate with those devices
(c)	adding the second new device to the multiprocessor system; and using the second new device in the multiprocessor system.	See '739 claim 1(c). SYNC can pair with multiple devices. After successful pairing of more than one device occurs, SYNC can connect with a second new device and use it in place of the first new device.
	8,020,028 Claim 30	**Accused Instrumentality**
	The method of claim 29 further comprising operating the first and second new devices to communicate with the multiprocessor system using Bluetooth signals.	See claim 29.

Exhibit J
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,020,028

	8,020,028 Claim 31	**Accused Instrumentality**
	A multiprocessor system, comprising:	Non-limiting preamble.
(a)	multiple processors operating together as a multiprocessor system, wherein the multiprocessor system is a distributed processing system configured to:	See '260 claim 9(a) (multiple processors), (b) (coupled). Two or more of the processors in the SYNC system operate as a distributed processing system.
(b)	identify a new device that is not currently coupled to the multiprocessor system,	See '739 claim 1(b) (detection of new devices).
(c)	connect the new device to the multiprocessor system when signaling from the new device conforms to a communication protocol used in the multiprocessor system,	See '119 claim 1(c).
(d)	configure the new device into the multiprocessor system,	See '119 claim 1(d).
(e)	identify data codes in the signaling from the new device identifying an application running on the new device, a data type used on the new device, and a security attribute associated with at least one of data stored in the new device and the application running on the new device,	See '118 claim 2(a).
(f)	use the identified security attribute to prevent at least one of an unauthorized applications and unauthorized data from being processed by the multiprocessor system,	See '118 claim 2(b).
(g)	identify at least one of a stored application in memory accessible by the multiprocessor system, wherein the application processes the same type of data processed by the	See '118 claim 2(c).

	new device,	
(h)	responsive to identifying the stored application, download the stored application from memory into at least one processor in the multiprocessor system, and	See '118 claim 2(d).
(i)	use the application to process data received from the new device, and	See '118 claim 2(e).
(j)	select an appropriate human machine interface to output the data.	See '118 claim 2(f).

EXHIBIT 12

Exhibit K
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,027,268

Subpart	8,027,268 Claim 1	Accused Instrumentality
	A vehicle audio system, comprising:	Non-limiting: The audio system in SYNC-equipped vehicles includes the elements identified below.
(a)	a wireless transceiver configured to wirelessly detect an audio source brought into or next to a vehicle; and	See '073 claim 1(a) (Cambridge Silicon Radio (CSR) Bluetooth (BT) transceiver or equivalent, which is incorporated in the SYNC system, is configured to detect BT wireless devices that can produce audio, such as a mobile phone or media player).
(b)	logic circuitry responsive to detection of the audio source configured to:	Hardware and software in the SYNC Accessory Protocol Interface Module (APIM), including the BT transceiver and BT software (the "APIM hardware and software"), is configured to do the following with respect to a detected BT device.
(c)	identify a security attribute associated with the audio source;	The APIM hardware and software is configured to identify whether the BT device has a link key or secret key (which is generated in the pairing process).
(d)	use the identified security attribute to identify the audio source as an authorized audio source or an unauthorized audio source;	The APIM hardware and software is configured to use the presence of a link key or secret key to identify the BT device as authorized (i.e., previously paired) and the absence of a link key or secret key to identify the BT device as unauthorized.

Exhibit K
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,027,268

(e)	responsive to identifying the audio source as an authorized audio source, connect the audio source to an on-board processor and identify a type of data processed with a first software application operated by the audio source; and	See '739 claim 1(d). Once the BT device is identified as authorized, the APIM hardware and software connects the BT device to a processor in the APIM and/or a processor in the Audio Control Module (ACM) on board the vehicle and identifies a type of data (e.g., voice data) processed by a software application running on the BT device.
(f)	responsive to identifying the type of data, dynamically configure a second software application from within the vehicle to: process the same type of data processed by the first software application operated by the audio source, initiate transfer of the data from the audio source to the on-board processor, and process the data received from the audio source,	See '739 claim 1(e & f), (i), and (k). Based on the identification of the type of data processed by the BT device and its software, the APIM hardware and software dynamically configures a software application stored on the SYNC system to process the same type of data, initiate transfer of that data from the BT device to the processor in the APIM or ACM, and then process that data.
(g)	wherein the wireless transceiver is further configured to wirelessly detect an additional audio source brought into or next to the vehicle; and	The SYNC system's BT transceiver is configured to detect more than one BT device producing audio that is brought into or next to the vehicle.
(h)	the logic circuitry is further configured to:	The APIM hardware and software is also configured to do the following:
(i)	identify a security attribute associated with the additional	See claim 1(c) above.

	audio source;	
(j)	use the identified security attribute to identify the additional audio source as an authorized audio source or an unauthorized audio source;	See claim 1(d) above.
(k)	responsive to identifying the additional audio source as an authorized audio source, connect the additional audio source to the on-board processor and identify a type of data processed with a third software application operated by the additional audio source, wherein the third software application is different from the first and second software applications; and	If the additional BT device is authorized, the device is connected to a processor in the APIM and/or a processor in the ACM, and the type of data the additional device uses and processes is identified. The software application used by the additional BT device to process that data (e.g., audio software) is not the same software used by the first BT device (e.g., phone software) or used by SYNC to process the first BT device's data (e.g., phone core software).
(l)	responsive to identifying the type of data, configure a fourth software application in the on-board processor, wherein the fourth software application is different from the first and second software applications, to: process the same type of data processed by the third software application operated by the additional audio source, initiate transfer of the data from the additional audio source to the on-board processor, and	Based on the type of data identified as processed by the additional BT device, the APIM hardware and software configures a software application in a processor in the APIM and/or a processor in the ACM that is different from the software used by the first BT device or by SYNC to process the first BT device's data, to do the following: process the same type of data from the additional BT device (e.g., audio), initiate transfer of the data from the additional BT device to

	process the data received from the additional audio source.	the processor, and process the data from the additional BT device.
	8,027,268 Claim 2	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein: the on-board processor is not configured to run the second software application and not configured to receive and process the data from the audio source prior to identification of the audio source; and in response to identifying the audio source, the on-board processor is configured to run the second software application and initiate transfer of the data from the audio source to the on-board processor.	See claim 1. See '739 claim 1(f), (i), and (k). Software applications for handling different data types in Windows Automotive are implemented as modules that are loaded and executed on a processor on an as-needed basis, once a BT device is identified. The processor is thereby configured to run the module and initiate transfer of data from the BT device to the processor.
	8,027,268 Claim 3	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein the on-board processor is configured to: display a first indicator of the audio source on an on-board display screen; display a second indicator of the additional audio source on	See claim 1. See '073 claim 1(a). The processor in the APIM and/or the processor in the ACM is configured to display icons or other indicators representing multiple detected BT devices on a display screen in the vehicle. It is further configured so that, based on a selection on the display screen, one BT

	the on-board display screen; in response to a selection on the on-board display screen, selectively connect the audio source to a first speaker located in a first section of the vehicle and connect the additional audio source to a second speaker located in a second section of the vehicle.	device (e.g., mobile phone) is connected to a front speaker and an additional BT device (e.g., media player), is connected to a rear speaker in the vehicle.
	8,027,268 Claim 4	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein the audio source is a cell phone and the additional audio source is an MP3 player.	See claim 1 (one audio source or BT device can be mobile phone and additional one can be MP3 player).
	8,027,268 Claim 5	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein the logic circuitry is further configured to: monitor a speed of the vehicle; and configure the on-board processor to run the second application based on the speed of the vehicle.	See claim 1. The APIM hardware and software is configured to monitor vehicle speed and configure a processor in the APIM to run the software application differently depending on the speed or movement of the vehicle. For example, BT phone contacts cannot be viewed and some text message features cannot be used when the vehicle moves faster than a certain speed, and the volume of audio changes with vehicle speed to compensate for road and wind noise.

	8,027,268 Claim 6	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein the audio source comprises a cell phone.	See claim 1 (audio source or BT device can be mobile phone).
	8,027,268 Claim 7	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein the on-board processor is coupled to a display and is configured to control a readable and writeable data storage media.	See claim 1. The processor in the APIM and/or the processor in the ACM is coupled to a display in the vehicle and is configured to control readable and writeable data storage media such as a USB memory stick.
	8,027,268 Claim 8	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein the on-board processor is coupled to a display and the display is coupled to an internal vehicle radio system.	See claim 1. The processor in the APIM and/or the processor in the ACM is coupled to a display in the vehicle, and the display is coupled to a radio system built into the vehicle.
	8,027,268 Claim 9	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein the on-board processor is configured to run a navigation system that operates in conjunction with a global positioning system.	See claim 1. In vehicles equipped with SYNC and navigation, the processor in the APIM and/or the processor in the ACM is

		configured to run a navigation system using the global positioning system (GPS) that is built into the vehicle.
	8,027,268 Claim 10	**Accused Instrumentality**
	The vehicle audio system according to claim 1 wherein the on-board processor is coupled to a display that includes a touch screen configured to operate as a user interface.	See claim 1. See '073 claim 2. The processor in the APIM and/or the processor in the ACM is coupled to a touch-screen display that operates as a user interface.
	8,027,268 Claim 11	**Accused Instrumentality**
	A vehicle data processing system, comprising:	Non-limiting: The data processing system in SYNC-equipped vehicles comprises the elements identified below.
(a)	a first data source in a vehicle;	SYNC-equipped vehicles include a variety of sources of audio and video data built into the vehicle, including a radio, CD/DVD player, and/or navigation system.
(b)	a transceiver configured to wirelessly detect and identify a second data source brought into or next to a vehicle; and	See '073 claim 1(a) (second data source is BT device).
(c)	a processor configured to: identify a security attribute associated with the second data source;	See claim 1(b), (c), (d), (e), and (f) above. A processor in the APIM is configured to do all of these things, including controlling the BT device.

	allow a connection with the second data source based on the identified security attribute; responsive to allowing the connection with the second data source, connect the data source to an on-board processor; identify a type of data used in the second data source and processed with a first software application operated by the second data source; identify a second software application located in memory in the vehicle; dynamically configure and initiate the second software application in the on-board processor to control the second data source; and initiate transfer of the data from the second data source to the on-board processor and use the second software application to process the data received from the second data source;	
(d)	wherein the transceiver is configured to wirelessly detect and identify a third data source brought into or next to the vehicle; and	See claim 1(g) above (third data source is additional BT device).

(e)	the processor is configured to: identify a security attribute associated with the third data source; allow a connection with the third data source based on the identified security attribute; responsive to allowing the connection with the third data source, connect the third data source to the on-board processor; identify a type of data used in the third data source and processed with a third software application operated by the third data source, wherein the third software application is different from the first and second software applications; identify a fourth software application located in memory in the vehicle, wherein the fourth software application is different from the first and second software applications; dynamically configure and initiate the fourth software application in the on-board processor to control the third data source; and initiate transfer of the data from the third data source to the on-board processor and use the fourth software application to process the data received from the third data source.	See claim 1(h), (i), (j), (k), and (l) above. The processor in the APIM is configured to do all of these things, including controlling the additional BT device.

	8,027,268 Claim 12	**Accused Instrumentality**
	The vehicle data processing system according to claim 11 wherein: the second software application is not configured in the on-board processor prior to identification of the second data source and is configured to run in the on-board processor and initiate transfer of the data from the second data source to the on-board processor in response to identifying the second data source.	See claim 11 and claim 2 above.
	8,027,268 Claim 13	**Accused Instrumentality**
	The vehicle data processing system according to claim 11 wherein the data includes audio data.	See claim 11. The data sources built into the vehicle and brought into or next to the vehicle (e.g, BT enabled mobile phone or media player) produce audio.
	8,027,268 Claim 14	**Accused Instrumentality**
	The vehicle data processing system according to claim 11 wherein the data includes video data.	See claim 11. The data source built into the vehicle (e.g., DVD player) produces video.

	8,027,268 Claim 15	**Accused Instrumentality**
	The vehicle data processing system according to claim 11 wherein the data includes graphic data.	See claim 11. The data source built into the vehicle (e.g., navigation, DVD player) and brought into or next to the vehicle (e.g., BT enabled mobile phone or media player providing album art) produce graphical images.
	8,027,268 Claim 16	**Accused Instrumentality**
	The vehicle data processing system according to claim 11 wherein the data includes text data.	See claim 11. The data sources built into the vehicle and brought into or next to the vehicle produce textual data.
	8,027,268 Claim 21	**Accused Instrumentality**
	A vehicle audio system, comprising:	Non-limiting: The audio system in SYNC-equipped vehicles includes the elements identified below.
(a)	a wireless transceiver configured to wirelessly detect an audio source brought into or next to a vehicle; and	See claim 1(a) above.
(b)	an application management system configured to:	Non-limiting: The SYNC system, including the APIM hardware and software, is an application management system because it is configured as identified below.

Exhibit K
Plaintiffs' Infringement Contentions for U.S. Patent No. 8,027,268

(c)	detect and establish communications with the audio source,	See claim 1(a) above (The APIM hardware and software is configured to detect and establish communications with a BT enabled device brought into or next to the vehicle).
(d)	check the audio source for an identification,	The APIM hardware and software is configured to check for the BT device's Bluetooth address or name.
(e)	check the audio source for an encryption key,	See claim 1(c) above.
(f)	check for data codes associated with the audio source,	The APIM hardware and software is configured to check a portion of the audio data from the BT device that indicates the type of data produced by the device.
(g)	connect the audio source to the vehicle audio system,	See claim 1(e) above (The APIM hardware and software are configured to connect a BT device with the vehicle's audio system).
(h)	use the data codes to identify data types used in the audio source;	See claim 21(f) above (The APIM hardware and software is configured to use a portion of the audio data produced by the BT device to identify the type of data used in the device).
(i)	identify a processor in the vehicle audio system that can input or output the identified data types; and	The APIM hardware and software is configured to identify a processor in the APIM or ACM that can input the type of data identified and/or identify a display or speaker in the

		vehicle to output the type of data identified.
(j)	in response to detecting the audio source, reconfigure the vehicle audio system to run a first application on the processor that processes the identified data types received from the audio source, wherein the vehicle audio system prior to detecting the audio source is not configured to run the first application and not configured to input or output the identified data types used in the audio source;	See claim 2 above. Upon detecting the BT enabled device, the APIM hardware and software reconfigure the system to run a software application that processes the type of data produced by the BT device. The system is not configured to run that software application or input or output that type of data prior to detection of the BT device, because the software applications for handling different data types in Windows Automotive are implemented as modules that are loaded and executed on a processor in the system on an as-needed basis.
(k)	wherein the wireless transceiver is further configured to wirelessly detect an additional audio source brought into or next to the vehicle; and	See claim 1(g) above.
(l)	the application management system is further configured to:	See claim 21(b) above.
(m)	detect and establish communications with the additional audio source,	See claim 21(c) above (The APIM hardware and software is configured to detect and establish communications with more than one BT enabled device).
(n)	check the additional audio source for an identification,	See claim 21(d) above.
(o)	check the additional audio source for an encryption key,	See claim 21(e) above.

(p)	check for data codes associated with the additional audio source,	See claim 21(f) above.
(q)	connect the additional audio source to the vehicle audio system,	See claim 21(g) above.
(r)	use the data codes to identify data types used in the additional audio source; and	See claim 21(h) above.
(s)	in response to detecting the additional audio source, reconfigure the vehicle audio system to run a second application on the processor that processes the identified data types received from the additional audio source, wherein the second application is different from the first application and the vehicle audio system prior to detecting the additional audio source is not configured to run the second application and not configured to input or output the identified data types used in the additional audio source.	See claim 21(j) above (The APIM hardware and software can reconfigure a processor in the APIM and/or a processor in the ACM to run different software applications that are appropriate for different types of data).
	8,027,268 Claim 22	**Accused Instrumentality**
	The vehicle audio system according to claim 21 wherein the audio source is a cellular telephone.	See claim 21 (audio source can be BT enabled mobile phone).
	8,027,268 Claim 23	**Accused Instrumentality**

	The vehicle audio system according to claim 21 wherein the audio source has an integrated display screen.	See claim 21. BT enabled mobile phones and media players have built-in display screens.
	8,027,268 Claim 25	**Accused Instrumentality**
	The vehicle audio system according to claim 21 wherein the audio source includes a data storage device.	See claim 21. BT enabled mobile phones and media players have data storage devices within them (e.g., solid state or flash memory).

EXHIBIT 13

Holly White

From: Genevieve Vose

Sent: Thursday, March 22, 2012 3:13 PM

To: 'Todd Zubler'

Cc: 'Amy C. Leshan'; 'Duncan Manville'; 'Elise Miller'; 'Frank Angileri'; 'Grant Rowan'; 'John S. LeRoy'; 'Michael Summersgill'; 'Sarah Petty'; 'Teran, Gregory'; Ian B. Crosby

Subject: EHH/Ford

Todd,

I received your voicemail telling me that you intend for file your motion today. I don't believe that motion is ripe -- you first called to introduce yourself and tell me that you were considering filing such a motion about four hours ago; I have not even had the opportunity to discuss it with the other lawyers on my team, some of whom are unavailable today.

We first heard from Ford on this when we received a letter from Michael Summersgill on February 15. After we sent our response on February 23, we heard nothing more about it. As you know, CR 37(a)(1)(A) requires a good faith effort to meet and confer including a face to face meeting or a telephone conference before filing a discovery motion. It is not a good faith meet and confer to call the day that you intend to file a motion to "confirm" that we are at an impasse. If you have a proposal for a compromise on this issue or a willingness to engage in a dialogue -- rather than simply reiterating your demand for each item in the February 15 letter -- we are open to considering such proposals. As of yet, you have made no meaningful attempt to compromise or have a dialogue on this issue. If you move forward with filing your motion, we will tell the Court that we believe it is premature and reserve the right to seek our costs under CR 37.

Thanks,

Genevieve Vose
SUSMAN GODFREY L.L.P.
1201 Third Ave., Ste. 3800
Seattle, WA 98101
(206) 516-3836

EXHIBIT 14

Holly White

From: Summersgill, Michael [Michael.Summersgill@wilmerhale.com]
Sent: Thursday, March 22, 2012 3:25 PM
To: Genevieve Vose; Zubler, Todd
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; Miller, Elise; 'fangileri@brookskushman.com'; Rowan, Grant; 'jleroy@brookskushman.com'; Petty, Sarah; Teran, Gregory; Ian B. Crosby
Subject: Re: EHH/Ford

Genevieve:

Ian was unequivocal in response to my letter that plaintiffs were not willing to supplement. Has plaintiff's position changed?

Thanks.

MJS

From: Genevieve Vose [mailto:gvose@SusmanGodfrey.com]
Sent: Thursday, March 22, 2012 06:13 PM
To: Zubler, Todd
Cc: Amy C. Leshan <aleshan@brookskushman.com>; Duncan Manville <dmanville@jetcitylaw.com>; Miller, Elise; Frank Angileri <fangileri@brookskushman.com>; Rowan, Grant; John S. LeRoy <jleroy@brookskushman.com>; Summersgill, Michael; Petty, Sarah; Teran, Gregory; Ian B. Crosby <icrosby@SusmanGodfrey.com>
Subject: EHH/Ford

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Thanks,

Genevieve Vose
SUSMAN GODFREY L.L.P.
1201 Third Ave., Ste. 3800
Seattle, WA 98101
(206) 516-3836

EXHIBIT 15

Holly White

From: Genevieve Vose
Sent: Thursday, March 22, 2012 4:00 PM
To: 'Summersgill, Michael'; 'Zubler, Todd'
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; 'Miller, Elise'; 'fangileri@brookskushman.com'; 'Rowan, Grant'; 'jleroy@brookskushman.com'; 'Petty, Sarah'; 'Teran, Gregory'; Ian B. Crosby
Subject: RE: EHH/Ford

Michael,

To date you haven't responded to Ian's letter which explained why we couldn't or were not required to supplement in the ways that you requested. So I'm not clear on what specifically you are asking us to do. But as I say below, if you have a proposal, we would be happy to discuss and are open to considering it. In particular, if we can supplement based on objective criteria that will put this issue to rest, we are open to doing so, and have some thoughts along those lines if you'd like to discuss.

Thanks,
Genevieve Vose
(206) 516-3836

From: Summersgill, Michael [mailto:Michael.Summersgill@wilmerhale.com]
Sent: Thursday, March 22, 2012 3:25 PM
To: Genevieve Vose; Zubler, Todd
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; Miller, Elise; 'fangileri@brookskushman.com'; Rowan, Grant; 'jleroy@brookskushman.com'; Petty, Sarah; Teran, Gregory; Ian B. Crosby
Subject: Re: EHH/Ford

Genevieve:

Ian was unequivocal in response to my letter that plaintiffs were not willing to supplement. Has plaintiff's position changed?

Thanks.

MJS

From: Genevieve Vose [mailto:gvose@SusmanGodfrey.com]
Sent: Thursday, March 22, 2012 06:13 PM
To: Zubler, Todd
Cc: Amy C. Leshan <aleshan@brookskushman.com>; Duncan Manville <dmanville@jetcitylaw.com>; Miller, Elise; Frank Angileri <fangileri@brookskushman.com>; Rowan, Grant; John S. LeRoy <jleroy@brookskushman.com>; Summersgill, Michael; Petty, Sarah; Teran, Gregory; Ian B. Crosby <icrosby@SusmanGodfrey.com>
Subject: EHH/Ford

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Thanks,

Genevieve Vose
SUSMAN GODFREY L.L.P.
1201 Third Ave., Ste. 3800
Seattle, WA 98101
(206) 516-3836

EXHIBIT 16

Holly White

From: Zubler, Todd [Todd.Zubler@wilmerhale.com]
Sent: Thursday, March 22, 2012 5:41 PM
To: Genevieve Vose
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; Miller, Elise; 'fangileri@brookskushman.com'; Rowan, Grant; 'jleroy@brookskushman.com'; Petty, Sarah; Teran, Gregory; Ian B. Crosby; Summersgill, Michael
Subject: RE: EHH/Ford
Importance: High

Genevieve,

Plaintiffs had an obligation to provide specific infringement contentions on February 2. When they failed to do so, we identified numerous specific deficiencies in their contentions and asked Plaintiffs to supplement their contentions and agree to extend Ford's time to respond. In Ian's February 23 letter, Plaintiffs flatly refused to make any accommodation and took a fundamentally different view as to what Plaintiffs' obligations are under the applicable rules:

> In sum, there is simply no requirement in the rules that plaintiffs infringement contentions marshal evidence, name unknown components, or describe functionality that is not required by the claims. Thus we decline to supplement our infringement contentions at this time or agree to an extension of the already ample time afforded to Ford to prepare its non-infringement and invalidity contentions.

Plaintiffs have now had two chances to comply with the rules but have been unwilling to do so. With the deadline of LPR 121 approaching, Ford is under no obligation to extend the process further by negotiating to give Plaintiffs a third chance to comply.

Indeed, CR 37(a)(1) does not impose any meet-and-confer obligation with respect to our contemplated motion, which, as I indicated, is a motion for judgment on the pleadings under Rule 12(c). We approached Plaintiffs today as a courtesy to make sure they had not changed their position and to determine if they were now willing to remedy the deficiencies Ford identified and extend Ford's deadline under LPR121. For Plaintiffs to suggest, after their unconditional rejection of our prior request, that they now have unidentified "thoughts" about how they might be willing supplement their contentions is not acceptable, given the case schedule currently in place. Unless Plaintiffs are willing to immediately agree to supplement their contentions and to extend Ford's time to respond pursuant to LPR 121, we will be forced to file our motion today.

Regards,

Todd

From: Genevieve Vose [mailto:gvose@SusmanGodfrey.com]
Sent: Thursday, March 22, 2012 6:59 PM
To: Summersgill, Michael; Zubler, Todd
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; Miller, Elise; 'fangileri@brookskushman.com'; Rowan, Grant; 'jleroy@brookskushman.com'; Petty, Sarah; Teran, Gregory; Ian B. Crosby

Subject: RE: EHH/Ford

Michael,

To date you haven't responded to Ian's letter which explained why we couldn't or were not required to supplement in the ways that you requested. So I'm not clear on what specifically you are asking us to do. But as I say below, if you have a proposal, we would be happy to discuss and are open to considering it. In particular, if we can supplement based on objective criteria that will put this issue to rest, we are open to doing so, and have some thoughts along those lines if you'd like to discuss.

Thanks,
Genevieve Vose
(206) 516-3836

From: Summersgill, Michael [mailto:Michael.Summersgill@wilmerhale.com]
Sent: Thursday, March 22, 2012 3:25 PM
To: Genevieve Vose; Zubler, Todd
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; Miller, Elise; 'fangileri@brookskushman.com'; Rowan, Grant; 'jleroy@brookskushman.com'; Petty, Sarah; Teran, Gregory; Ian B. Crosby
Subject: Re: EHH/Ford

Genevieve:

Ian was unequivocal in response to my letter that plaintiffs were not willing to supplement. Has plaintiff's position changed?

Thanks.

MJS

From: Genevieve Vose [mailto:gvose@SusmanGodfrey.com]
Sent: Thursday, March 22, 2012 06:13 PM
To: Zubler, Todd
Cc: Amy C. Leshan <aleshan@brookskushman.com>; Duncan Manville <dmanville@jetcitylaw.com>; Miller, Elise; Frank Angileri <fangileri@brookskushman.com>; Rowan, Grant; John S. LeRoy <jleroy@brookskushman.com>; Summersgill, Michael; Petty, Sarah; Teran, Gregory; Ian B. Crosby <icrosby@SusmanGodfrey.com>
Subject: EHH/Ford

Todd,

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Thanks,

Genevieve Vose
SUSMAN GODFREY L.L.P.
1201 Third Ave., Ste. 3800
Seattle, WA 98101
(206) 516-3836

EXHIBIT 17

Holly White

From: Genevieve Vose
Sent: Thursday, March 22, 2012 7:12 PM
To: 'Zubler, Todd'
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; 'Miller, Elise'; 'fangileri@brookskushman.com'; 'Rowan, Grant'; 'jleroy@brookskushman.com'; 'Petty, Sarah'; 'Teran, Gregory'; Ian B. Crosby; 'Summersgill, Michael'
Subject: RE: EHH/Ford

Todd, no one is forcing you to do anything. You re-raised this issue out of the blue today after a month's silence -- frankly, we thought it was resolved. I have repeatedly indicated that we are willing to discuss this further, will entertain a proposal from you, and have some ideas of our own that we could share. But if you are insistent that your motion is necessary unless we immediately agree to (1) supplement our contentions, in a way and to a standard that you have not yet described, and (2) indefinitely extend Ford's time to serve its PR 121 contentions, a proposal you are raising now for the first time, then, yes, I think we are at an impasse.

As for whether we have an obligation to confer about this under the Rules, I think we do. When we spoke about this today, you said you were contemplating filing a motion for judgment on the pleadings, and in the alternative, a motion to compel. I think such a motion triggers a duty under the rules to confer. But setting that aside, professional courtesy dictates that we would attempt to work this out before going to the Court. I'm disappointed that Ford seems to be unwilling to do so.

Genevieve Vose
(206) 516-3836

From: Zubler, Todd [mailto:Todd.Zubler@wilmerhale.com]
Sent: Thursday, March 22, 2012 5:41 PM
To: Genevieve Vose
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; Miller, Elise; 'fangileri@brookskushman.com'; Rowan, Grant; 'jleroy@brookskushman.com'; Petty, Sarah; Teran, Gregory; Ian B. Crosby; Summersgill, Michael
Subject: RE: EHH/Ford
Importance: High

Genevieve,

Plaintiffs had an obligation to provide specific infringement contentions on February 2. When they failed to do so, we identified numerous specific deficiencies in their contentions and asked Plaintiffs to supplement their contentions and agree to extend Ford's time to respond. In Ian's February 23 letter, Plaintiffs flatly refused to make any accommodation and took a fundamentally different view as to what Plaintiffs' obligations are under the applicable rules:

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Sent: Thursday, March 22, 2012 6:59 PM
To: Summersgill, Michael; Zubler, Todd
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; Miller, Elise; 'fangileri@brookskushman.com'; Rowan, Grant; 'jleroy@brookskushman.com'; Petty, Sarah; Teran, Gregory; Ian B. Crosby
Subject: RE: EHH/Ford

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Thanks,
Genevieve Vose
(206) 516-3836

From: Summersgill, Michael [mailto:Michael.Summersgill@wilmerhale.com]
Sent: Thursday, March 22, 2012 3:25 PM
To: Genevieve Vose; Zubler, Todd
Cc: 'aleshan@brookskushman.com'; 'dmanville@jetcitylaw.com'; Miller, Elise; 'fangileri@brookskushman.com'; Rowan, Grant; 'jleroy@brookskushman.com'; Petty, Sarah; Teran, Gregory; Ian B. Crosby
Subject: Re: EHH/Ford

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MJS

From: Genevieve Vose [mailto:gvose@SusmanGodfrey.com]
Sent: Thursday, March 22, 2012 06:13 PM
To: Zubler, Todd
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Thanks,
Genevieve Vose
SUSMAN GODFREY L.L.P.
1201 Third Ave., Ste. 3800
Seattle, WA 98101
(206) 516-3836

EXHIBIT 18

Holly White

From: Genevieve Vose

Sent: Wednesday, March 28, 2012 10:53 AM

To: Amy C. Leshan; Duncan Manville; Elise Miller; Frank Angileri; Grant Rowan; John S. LeRoy; Michael Summersgill; Sarah Petty; Todd Zubler

Cc: Ian B. Crosby; Floyd G. Short

Subject: EHH/Ford - Pls.' infringement contentions

Counsel,

Although Ford went ahead and filed its motion for judgment on the pleadings and to compel on Thursday, the offer we made when you contacted us before you filed to discuss a reasonable compromise is still open. To that end (and though we continue to disagree that such supplementation is required), Plaintiffs are willing to supplement their infringement contentions by identifying supporting documents if Ford withdraws its motion. We could do so in three weeks' time and would be amenable to providing Ford a commensurate three-week extension for Ford's invalidity and non-infringement contentions. Please let us know by Friday if you agree.

Thanks,

Genevieve Vose
SUSMAN GODFREY L.L.P.
1201 Third Ave., Ste. 3800
Seattle, WA 98101
(206) 516-3836

EXHIBIT 19

Holly White

From: Zubler, Todd [Todd.Zubler@wilmerhale.com]
Sent: Monday, April 02, 2012 10:58 AM
To: Genevieve Vose
Cc: Ian B. Crosby; Floyd G. Short; Amy C. Leshan; Duncan Manville; Miller, Elise; Frank Angileri; Rowan, Grant; John S. LeRoy; Summersgill, Michael; Petty, Sarah; Teran, Gregory
Subject: RE: EHH/Ford - Pls.' infringement contentions
Follow Up Flag: Follow up
Flag Status: Red

Genevieve,

Although we are pleased Plaintiffs have offered to supplement their infringement contentions, Ford cannot accept your proposal below.

First, Ford cannot evaluate the sufficiency of any supplemental contentions without actually seeing them. We note, for example, that you offer below only to identify supporting documents. Such supplementation would be welcome, but Ford's motion is based on more than the failure to cite documents; it is also based on a more general failure by Plaintiffs to make specific allegations regarding what components infringe and how they allegedly do so.

Second, a three-week extension of Ford's LPR 121 deadline is insufficient because it would leave Ford with less time than it is entitled to under the case schedule to respond to properly detailed infringement contentions. Ford's time to respond should not be abbreviated because Plaintiffs failed to comply with their obligations under LPR120.

We would suggest that Plaintiffs supplement their contentions as soon as possible, at which time Ford can determine whether the supplemented contentions address the issues raised in Ford's motion. In any event, Ford will be asking the Court to extend Ford's LPR 121 deadline if the Court does not grant judgment under Rule 12(c). As you are aware, we have already asked the Court to grant an extension from the time of any supplementation that would give us the allotted time under the scheduling order.

Regards,

Todd

Todd C. Zubler
Wilmer Cutler Pickering Hale and Dorr LLP
1875 Pennsylvania Avenue NW
Washington, DC 20006 USA
+1 (202) 663-6636 (t)
+1 (202) 663-6363 (f)
todd.zubler@wilmerhale.com

Thank you.

For more information about WilmerHale, please visit us at http://www.wilmerhale.com.

From: Genevieve Vose [mailto:gvose@SusmanGodfrey.com]
Sent: Wednesday, March 28, 2012 1:53 PM
To: Amy C. Leshan; Duncan Manville; Miller, Elise; Frank Angileri; Rowan, Grant; John S. LeRoy; Summersgill, Michael; Petty, Sarah; Zubler, Todd
Cc: Ian B. Crosby; Floyd G. Short
Subject: EHH/Ford - Pls.' infringement contentions

Counsel,

Although Ford went ahead and filed its motion for judgment on the pleadings and to compel on Thursday, the offer we made when you contacted us before you filed to discuss a reasonable compromise is still open. To that end (and though we continue to disagree that such supplementation is required), Plaintiffs are willing to supplement their infringement contentions by identifying supporting documents if Ford withdraws its motion. We could do so in three weeks' time and would be amenable to providing Ford a commensurate three-week extension for Ford's invalidity and non-infringement contentions. Please let us know by Friday if you agree.

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Seattle, WA 98101
(206) 516-3836

EXHIBIT 20

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT TACOMA

CHASSIDY F. LUCAS, et al., Plaintiffs, v. JOE CAMACHO, et al., Defendants.	CASE NO. C11-5350BHS ORDER DENYING PLAINTIFFS' MOTION TO COMPEL

This matter comes before the Court on Plaintiffs Chassidy Lucas, Bianca Lucas, and CB Stormwater's ("Plaintiffs") motion to compel (Dkt. 34). The Court has reviewed the briefs filed in support of and in opposition to the motion and the remainder of the file and hereby denies the motion for the reasons stated herein.

I. PROCEDURAL HISTORY

On May 5, 2011, Plaintiffs filed a complaint against Defendants Joe Camacho, Deborah Camacho, Angela Stephenson, George Parker, and Ali Parker. Dkt. 1. On May 16, 2011, the Court issued an order establishing certain deadlines as follows: Joint Status Report due by 9/13/2011, FRCP 26f Conference Deadline is 8/23/2011, Initial Disclosure Deadline is 9/6/2011. Dkt. 3.

On July 25, 2011, Plaintiffs filed a motion to compel production of Defendants' financial records. Dkt. 34. On August 8, 2011, Defendants Joe Camacho, Deborah Camacho, and Angela Stephenson responded. Dkt. 38. On August 2, 2011, Defendants George Parker and Ali Parker responded. Dkt. 42. Plaintiffs did not reply.

II. DISCUSSION

"A party may not seek discovery from any source before the parties have conferred as required by Rule 26(f) . . . ." Fed. R. Civ. P. 26(d)(1). In a party fails to comply with a proper discovery request, the opposing party may file a motion to compel. Fed. R. Civ. P. 37(a)(1). The motion must contain a certification that the moving party has made a good faith attempt to resolve the discovery dispute with the opposing party. *Id.* If the Court denies a motion to compel, it must, after notice and an opportunity to be heard, require the movant to pay the opposing parties' reasonable fees in opposing the motion. Fed. R. Civ. P. 37(a)(5)(B).

In this case, Plaintiffs' motion to compel is premature and they have failed to certify that they have attempted in good faith to resolve the alleged discovery dispute before seeking intervention from the Court. Therefore, the Court denies the motion. The Court must award fees to Defendants and will set a briefing schedule for this issue.

III. ORDER

Therefore, it is hereby **ORDERED** that Plaintiffs' motion to compel (Dkt. 34) is **DENIED**. Defendants may file a brief regarding reasonable fees no later than September 16, 2011. Plaintiffs may file a response no later than September 23, 2011. No reply shall be filed unless requested by the Court.

DATED this 8th day of September, 2011.

BENJAMIN H. SETTLE
United States District Judge

EXHIBIT 21

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT TACOMA

CHASSIDY F. LUCAS, et al., Plaintiffs, v. JOE CAMACHO, et al., Defendants.	CASE NO. C11-5350BHS ORDER

This matter comes before the Court on Defendants Joe Camacho, Deborah Camacho, and Angela Stephenson's ("Camacho Defendants") request for fees (Dkt. 63), Defendants George and Lori Parker's ("Parkers") request for fees (Dkt. 65), and Plaintiffs Chassidy Lucas, Bianca Lucas, and CB Stormwater's ("Plaintiffs") motion for trial (Dkt. 68). The Court has reviewed the briefs filed in support of the requests and motion and the remainder of the file.

I. PROCEDURAL HISTORY

On May 5, 2011, Plaintiffs filed a complaint alleging patent infringement by both the Camacho Defendants and the Parkers. Dkt. 1.

On July 25, 2011, Plaintiffs filed a motion to compel. Dkt. 34. On August 1, 2011, the Camacho Defendants responded. Dkt. 40. On August 2, 2011, the Parkers responded. Dkt. 42. On September 8, 2011, the Court denied Plaintiffs' motion, awarded Defendants reasonable fees in responding to the motion, and requested briefing on the amount of such fees. Dkt. 60.

On September 13, 2011, the Camacho Defendants filed a brief in support of their fees. Dkt. 62. On September 19, 2011, the Parkers filed a brief in support of their fees. Dkt. 65.

On September 21, 2011, Plaintiffs filed a motion for trial. Dkt. 68. On September 28, 2011, the Camacho Defendants responded. Dkt. 70. On September 29, 2011, the Parkers responded. Dkt. 73.

II. DISCUSSION

A. Fees

In this case, the Court awarded Defendants reasonable fees in responding to Plaintiffs' premature motion to compel. The Camacho Defendants have requested $300 in fees. The Court finds that this amount is reasonable. Therefore, Plaintiffs are ordered to pay the Camacho Defendants $300 within a reasonable time.

The Parkers also request fees for the time expended representing themselves pro se. The Parkers assert that they expended valuable time and resources in responding to Plaintiffs' motion and request to be reimbursed at a rate that the Court deems reasonable. First, the Parkers' response was very similar to the Camacho Defendants' response, which was prepared by an attorney and submitted one day prior to the Parkers' response. The Court is not persuaded that the Parkers expended valuable time or resources drafting their response. Second, the Parkers have failed to document their time or submit such documentation for the Court's consideration. Therefore, the Court denies the Parkers' request for fees because they have failed to provide evidence of an appropriate reimbursement amount.

B. Motion for Trial

Although Plaintiffs' motion is somewhat confusing, it appears that Plaintiffs have submitted a motion to set a trial date instead of participating in the initial conference and submitting a Joint Status Report. *See* Dkt. 68. Plaintiffs are informed that it is their

responsibility to schedule an initial conference and submit a Joint Status Report. *See* Dkt. 3. Failure to do either of these tasks may result in dismissal of the action for failure to comply with the Court's explicit order. In any event, the Court denies Plaintiffs' motion to set a trial date and orders Plaintiffs to submit a Joint Status Report that is signed by all parties no later than October 28, 2011. Failure to submit such a report may result in dismissal unless good cause is shown for such failure.

III. ORDER

Therefore, it is hereby **ORDERED** that the Camacho Defendants' request for fees (Dkt. 63) is **GRANTED**, the Parkers' request for fees (Dkt. 65) is **DENIED**, and Plaintiffs' motion for trial request (Dkt. 68) is **DENIED.** Plaintiffs shall file a Joint Status Report signed by all parties no later than October 28, 2011.

DATED this 17th day of October, 2011.

BENJAMIN H. SETTLE
United States District Judge

EXHIBIT 22

Microsoft Auto 3.1 Platform Overview

Proven technology adapted for the auto industry

Published: November 2008

For the latest information, please see:
http://www.microsoft.com/auto

Abstract

Automakers and auto suppliers are being challenged to meet a rapidly growing demand for in-car information, navigation, entertainment, and communication systems. However, controlling cost, delivering products to market in a timely manner, incorporating ever-evolving technologies, and delivering the added value needed to stand out in a competitive environment may all delay progress toward meeting market demand. Consumers require a high level of quality and reliability and expect rich features that are easy to use. At the same time, the systems they desire are often complex to create. The in-vehicle environment provides limited computing resources and the applications developed usually need to be integrated across many different vehicle makes and models.

To help address these challenges, Microsoft, working in partnership with the automotive industry, has developed Microsoft® Auto —a powerful, scalable, and flexible software platform and development reference design that helps the auto industry deliver rich, integrated in-car infotainment systems faster, easier, and at lower cost. Microsoft Auto can expand the capabilities of automakers and suppliers to make the most of the opportunities created by today's demanding consumers.

Contents

Introduction

Customers today demand the ability to stay connected with all of their information and entertainment sources while traveling in their cars. They want their mobile devices—such as mobile phones, portable navigation devices, and portable music players—seamlessly integrated into their vehicles.

According to research carried out by ABI Research, approximately 40 million navigation systems were sold in 2007, and 28 million of those were portable navigation devices. When this data is combined with research from the U.S. Department of Transportation and National Highway Traffic and Safety Administration estimating that Americans spend more than 500 million commuter hours per week in their vehicles and that 73 percent of mobile phone users talk on their phones while driving, it is clear that consumers increasingly want to stay connected, even when they are behind the wheel.

Microsoft is at the forefront of this trend, partnering with the automotive, mobile, and consumer electronics industries to provide enabling technologies that can help these industries quickly bring feature-rich, innovative, and cost-effective solutions to the market. The Microsoft® Auto platform—a development platform that includes an extensive software framework and development hardware reference design specifically engineered for the automotive industry—empowers application designers to develop a variety of integrated solutions that can help customers get to their destination while keeping them connected to the people, information, and digital entertainment that matters to them.

This white paper introduces Microsoft Auto and describes the platform's unique features. The paper discusses the challenges faced by automakers and suppliers in bringing integrated solutions to market, and it explains how the Microsoft Auto platform helps overcome those challenges by providing the foundation for quickly and reliably creating a broad range of extensible, customizable, and advanced in-vehicle solutions.

The Challenges

While the market opportunity is ripe for a new generation of integrated in-car systems, automakers and suppliers face a paradoxical set of design requirements: rich (and typically very complex) features, high quality and reliability, rapid time-to-market, and competitive cost. While a vehicle is typically designed four years in advance, many consumer electronic devices have a life span as short as six months. This means that by the time the system actually hits the market, the consumer-facing technologies prevalent at design time might be close to obsolete, making "updateability" an important consideration.

For automotive manufacturers, there are the additional challenges of device manufacturing, vehicle integration, adaptability (devices are generally integrated into several vehicle models, thus amortizing the system cost to the automaker), and extensibility.

Microsoft is helping the automakers and suppliers meet these challenges through Microsoft Auto, development and software reference design platform that empowers automakers and suppliers to more quickly and easily build solutions that provide consumers with the features they demand.

What Is Microsoft Auto 3.0?

Microsoft Auto 3.0 provides automakers, suppliers, and developers with the building blocks they need to quickly and reliably create a broad range of advanced in-vehicle solutions that meet the growing needs of automotive consumers.

Microsoft Auto 3.0 is based on the leading embedded operating system from Microsoft, Windows® Embedded CE 6.0 R2. Microsoft Auto 3.0 installs on top of Windows Embedded CE 6.0 R2 and adds automotive-specific functionality; this extends the capabilities of the operating system while maintaining its flexibility.

The Microsoft Auto 3.0 software stack includes all underlying drivers for the development hardware reference design, the supporting middleware and application framework, and the device management tools. The design uses technologies from various Microsoft groups, including Digital Rights Management, the Digital Media Division, Microsoft® Visual Studio®, Windows Embedded CE 6.0 R2, Windows®, and Windows Mobile®. The reuse of these existing, widely deployed technologies and components helps to ensure the stability of the designs.

Using various combinations of the Microsoft Auto 3.0 system abilities, suppliers can make a variety of scenarios possible, including:

- Speech-based interaction with the user.
- Ability to play media from a USB storage device or to connect a media device to a USB port.
- Location information using GPS.
- Ability to easily and securely update itself to obtain new applications, features, or even operating system updates.
- Integration with mobile devices using *Bluetooth®* wireless technology.

All the other features of a navigation system (such as a graphical user interface, CAN/MOST access, and radio integration) can be added by any supplier.

Microsoft Auto 3.0 includes a wide variety of functionality, including:

- *Bluetooth®* 2.0+EDR support.
    - Including a range of profiles and technologies used for integration of mobile phones and portable media players
- Hands-free phone integration of *Bluetooth®*-enabled mobile phones.
    - Access to the contacts on the connected mobile phone
    - Send and receive Short Message Service (SMS) messages
    - Rich call control and multiple-call scenarios
    - Compatibility with a wide range of mobile phones
- Integration of portable media players.
    - Support for a wide range of portable multimedia players (PMPs), including iPod, Zune®, Creative, and others
    - Play media from an inexpensive USB storage device, or other removable storage
    - Indexing and access to the metadata stored in the digital music brought into the car
    - Play DRM-protected music from most media players
- In-car device updatability.

  - Device management technology in Microsoft Auto 3.0 makes a range of update scenarios possible.
  - Includes the ability to provide new applications in addition to service updates.
  - Updates can be applied by the owner of the vehicle, saving time and cost.
- Rich speech experiences.
  - Speech engines from Nuance Communications and Siemens AG are included for development purposes.
  - Speech components help integrate multiple applications into the speech system.
  - The tools and power are included to create rich speech experiences, as demonstrated by the Ford SYNC.
- Rich development tools.
  - Microsoft Auto 3.0 is built on Windows Embedded CE 6.0 R2.
  - Integration with Microsoft® Platform Builder and Visual Studio provides a rich development environment.
- Board Support Packages (BSP) are included for:
  - Freescale i.MX31 processor.
  - Texas Instruments Jacinto processor and the EVM prototyping circuit board.

What is new in Microsoft Auto 3.1?

Microsoft Auto 3.1 is the latest release in Microsoft's leading automotive focused software platform described in detail in this whitepaper. This latest release enhances the building blocks available to the automotive industry creating a broad-range of innovative in-vehicle solutions. Built on top of Windows Embedded CE 6.0 R2, Microsoft Auto 3.1 adds new support in a number of areas to the Microsoft Auto platform to support the continued creation of great in-vehicle systems.

The improvements made for Microsoft Auto 3.1 include:

- Availability of a new Board Support Package (BSP) for the Renesas SDK-7785 system development kit enabling a new class of processor support for Microsoft Auto
- Significantly improved BSP for Texas Instruments' TMS320DRA446 (Jacinto) EVM board
- Improved media device support including:
  - Support for browsing the device while it is being indexed
  - Additional information about the media on the device
  - Support for accelerated audio during fast-forward and rewind operations
  - Improved application control over device indexing, allowing better implementations of media storage permanently in the vehicle
- Improved Bluetooth support including:
  - Support for new high-quality Bluetooth ringtones
  - More easily pluggable Bluetooth profiles
  - Support for the MP3 codec streamed over Bluetooth A2DP
  - Substantially more phones validated for compatibility with Microsoft Auto

In addition to an improvement to the core software platform, with Microsoft Auto 3.1 we are also making available a new toolkit which will allow **Live Search for Devices** to be implemented on any Microsoft Auto device. Carmakers and suppliers now can easily integrate location based point-of-interest (POI) searches into their Microsoft Auto devices using one of the industry leading search technologies. This Live Search for Devices toolkit supports:

- A robust API which any application on the Microsoft Auto device can use for doing powerful POI searches
- Data transfers optimized for low-bandwidth connections
- Searches optimized to reduce transaction latency
- A single point of access to multiple live.com databases
- Servers managed and maintained by Microsoft, providing high availability, unique device identification and activity reports available to the carmaker or supplier
- Content includes Yellow Pages, White Pages and user Ratings information

The fact that we are including Live Search for Devices to our platform is another example that Microsoft is committed to deliver innovative solutions. The inclusion of Live Search for Devices will enable automotive companies to offer dynamic, connected service content to consumers.

With Microsoft Auto 3.1 and the Live Search for Devices toolkit, entirely new classes of innovative in-vehicle solutions are just waiting to be created!

Why Microsoft Auto?

The base software platform is known to be stable and robust because the common underlying application functionality provided by Microsoft Auto 3.0 has been tested and implemented across multiple solutions with multiple automakers. Suppliers and automakers can therefore reuse their software components, reducing the time-to-market for their devices.

With Microsoft Auto, applications are developed for the platform rather than for a specific device model, resulting in amortized costs through easy portability. Microsoft Auto provides the application functionality without specifying the user experience, so that automakers or suppliers can provide the unique experience that their customers demand.

Microsoft Auto provides automakers and suppliers with:

- A general software platform, empowering suppliers to build a rich family of automotive devices, such as portable devices, gateways, and full head units.
- The ability to create and maintain a consistent platform, making connected-car experiences possible.

Available Now

Drivers and passengers can now experience Microsoft technology in the Fiat Blue&Me™ and the Ford Sync.

Fiat Blue&Me

Fiat Auto Group and Microsoft jointly developed the infotainment system Blue&Me, which empowers customers to connect their personal mobile devices with the integrated solution found in many vehicle models from Fiat, Alfa Romeo, Lancia, and Fiat Light Commercial Vehicles. The competitively priced Microsoft Auto-based infotainment package comes with *Bluetooth®* wireless technology and USB connectivity, letting drivers listen to music from their personal USB storage devices. The integrated voice-controlled hands-free phone kit in the vehicles connects to a large number of mobile phone models, in addition to digital USB storage devices. The Blue&Me system is based on a modular structure, and can therefore be easily updated to support different services. For example, customers can download language packs from the Fiat Web site and update their system to support a language not originally installed.

Ford Sync

Ford Sync is a factory-installed fully-integrated in-car communications and entertainment system developed by Microsoft and Ford. The Microsoft Auto-based Ford Sync is a consumer device gateway similar to the Fiat Blue&Me, but with significant unique features. Ford Sync provides drivers with hands-free voice-activated control over mobile phones and digital music players. Ford Sync automatically connects phones and music players with the vehicle's in-car microphone and sound system. Most popular media players work with Ford Sync, including iPod, Zune, "Plays for Sure" players, and most USB storage devices. Supported audio formats include MP3, AAC, WMA, and WAV.

Ford Sync is based on an ARM 11 processor, 64 MB of DRAM, and 256 MB of flash memory. Customers can use the USB port to update the software to work with the newest personal electronic devices—this is an important advantage, as customers tend to change devices more frequently than they change vehicles.

Ford Sync debuted in the fall of 2007 on 12 different 2008 models of Ford, Mercury, and Lincoln vehicles. By the end of 2009, Ford will install Sync on all vehicle models.

Continental AG Multi Media Platform (MMP)

Continental AG is using Microsoft Auto for its Multi Media Platform (MMP), which provides powerful, secure, flexible, and easy-to-update in-vehicle multimedia systems. The Continental MMP software architecture clearly separates vehicle functions and the functions related to entertainment features, making it possible to quickly react to future innovations and market trends. In the MMP hardware design, Continental uses a scalable concept to ensure top performance at high integration. For high-end systems, another CPU and graphics processor provides additional power for online services and 3D graphics applications.

The hardware is equipped with standard consumer electronics interfaces, so that mobile devices (such as USB storage devices, iPods, or SD cards) can be easily networked with the MMP. The MMP also provides a *Bluetooth®* wireless technology interface, so that consumers can use mobile phones for hands-free phone calls or mobile data services.

Carmakers and Tier One suppliers can ensure their systems stay current with the latest devices and services thanks to the inherently flexible design and built-in software update mechanisms of Microsoft Auto. Unique solutions and customized user interfaces can also be easily built on top of the existing platform. Some of the examples of customized solutions include:

- **911 Assist**, an update made to Ford SYNC, will connect the vehicle's occupants, through their mobile device, to 911 operators in the event of an airbag deployment.
- **Ford Works** is an in-dash computer developed by Ford and Magneti Marelli, powered by Microsoft Auto that provides full high-speed Internet access via the Sprint Mobile Broadband Network and navigation by Garmin. This system allows customers to print invoices, check inventories and access documents stored on their home or office computer networks – right on the job site.
- **EcoDrive**, another step in the innovative collaboration between Fiat Group Automobiles and Microsoft, collects all necessary data relating to vehicle efficiency and, through Blue&Me's USB port, transmits it onto a normal USB key that the driver plugs this into a PC. The **EcoDrive** system presents the driver with detailed environmental performance of the car including the CO2 emission level for each trip. It analyses the driver's style and then provides tips and recommendations on how to make modifications to achieve CO2 reductions – and save money on fuel.
- **Blue&Me MAP** is a multi-functional portable navigator, which gives drivers a completely integrated and connected infotainment experience. With an original design developed with Magneti Marelli specifically for the Fiat 500 developed- the device represents a new frontier in the portable navigation systems market.

Microsoft Auto 3.1 Platform Overview

Microsoft Auto 3.1 is designed to implement state-of-the-art infotainment systems for today's automotive industry; it is an ideal application development platform because it provides a rich programming environment that empowers application developers to add functionality. The flexible Microsoft Auto 3.1 platform targets a wide range of devices, including connectivity gateways, connected radios, multimedia devices, and navigation head units.

The following diagram gives an overview of the various building blocks that make up the Microsoft Auto 3.1 system. The light red sections represent components provided by Microsoft Auto 3.0. The dark blue sections represent components provided by suppliers or third parties. The light blue vertical strip represents development tools; these tools bring the entire system together and cross all layers of the software stack. In the combined dark blue and light red section, some of the components are provided by Microsoft Auto 3.1, and some are provided by third parties.

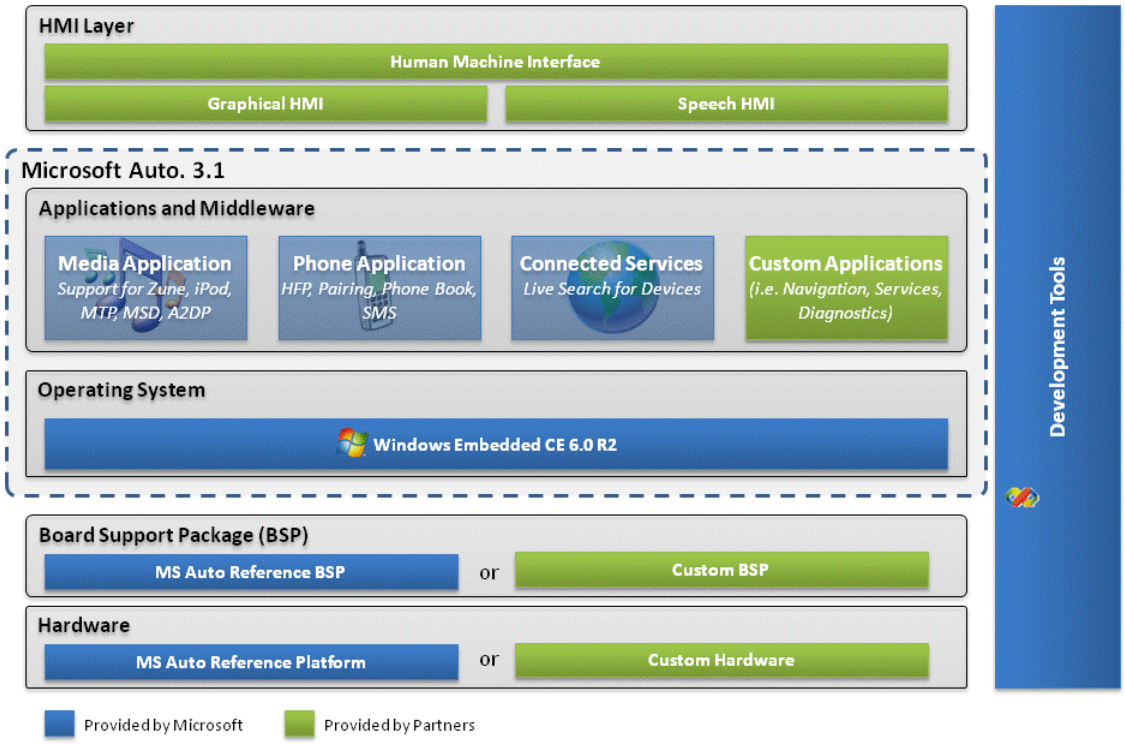

Figure 1 Microsoft Auto 3.1 platform

The Microsoft Auto 3.0 platform is made up of the following components:

- **Hardware.** Provided by the suppliers.
- **Drivers/Board Support Package (BSP).** Provided by both Microsoft and by suppliers.

- **Microsoft Auto base operating system.** Windows Embedded CE 6.0 R2, written from the ground up to provide a real-time operating system for embedded devices.
- **Microsoft Auto middleware.** The Microsoft Auto middleware is much of the "plumbing" for the software platform. Examples include the *Bluetooth®* wireless technology stack, the hands-free mobile phone service, and the media player engine.
- **Microsoft Auto application cores.** The application cores are the most visible part of the software platform. The APIs are organized and structured in a similar way to the desktop version of Windows so that computer knowledge and techniques can be reused. This makes it possible for new development resources to be deployed and made productive more quickly. The applications have been designed so that the Human-Machine Interface (HMI) is easily separable; for example, the media player is composed of a media player core and a supplier-provided application HMI.
- **Third-party and HMI applications.** Third-party and HMI applications interact with the user. This portion of the application can be easily changed without disturbing the underlying application.

Development Hardware Reference Design

Microsoft Auto 3.1 provides a development hardware reference design based on the Freescale™ i.MX31 microprocessor. (Suppliers provide the final hardware.) The Microsoft Auto 3.1 software is compatible with other ARM-based microprocessors, and also includes a board support package for the Texas Instruments Jacinto processor.

Functionality and features of the system rely on some fundamental primitives supported by the base system hardware components (such as management of device power states and transitions, management of NAND flash, and support for data transfer over USB ports)—these are supported by the development hardware reference design. For example, the flash driver provides support for primitives required for reading and writing to NAND flash to various system components, including file systems and low-level boot loaders. The flash driver is responsible for handling bit errors and bad blocks, helping to ensure power-safe operation of the flash memory and distributing flash writes evenly to maximize flash life. The development hardware reference design uses 256 MB NAND flash memory to store the operating system image, the applications, the speech engines, and additional application data. The actual requirements of a specific device depend on the scenarios and data that are required to be supported. Additional details of the development hardware reference design are shown in Appendix 2.

The development hardware reference design is not mandatory to build devices based on Microsoft Auto 3.1. A supplier can choose one of the supported processor platforms that ship with Microsoft Auto 3.1, or they may choose to develop a Windows Embedded CE 6.0 Board Support Package (BSP) for another processor family. Documentation is available on the requirements for transforming a standard Windows Embedded CE 6.0 BSP into one that can fully support the functionality of the Microsoft Auto platform. The layered architecture, the operating system, middleware, and applications should not be significantly affected when repurposing a standard Windows Embedded CE 6.0 BSP into one that supports Microsoft Auto 3.1.

Board Support Package

The Board Support Package includes hardware-specific components such as a boot loader, an OEM adaptation layer (OAL), device drivers, and run-time image configuration files.

The OAL includes the lowest-level components that initialize the CPU, peripherals, and other hardware modules. The OAL interacts directly with the hardware and abstracts the specifics of the hardware from the upper layers. The OAL is typically built when developing the BSP; it is built as a library (HAL.lib) and linked into the overall kernel executable (Nk.exe).

Operating System

The base operating systems layer provides the platform-level features of the Microsoft Auto 3.1 system. This layer includes support for:

- File systems.
- Windowing and focus management.
- Speech API components that expose the chosen speech recognition and text-to-speech (TTS) engines.
- Access to operations supported by the various hardware modules on the system.
- Networking transports and protocols (TCP/IP and *Bluetooth®* wireless technology).

The base operating system is built on top of Windows Embedded CE 6.0 R2. The Windows Embedded CE 6.0 R2 kernel exposes core system functionality and provides the infrastructure through which the rest of the system software can interface with the OAL. The Windows Embedded CE 6.0 R2 kernel is primarily responsible for process and thread management, predictable thread scheduling, memory management, and interrupt handling and support for system calls.

Features of Windows Embedded CE 6.0 R2 include:

- A Win32 API subset, including file and memory management, device and service management, threads and process management, and networking stacks.
- Platform Builder 6.0 and other powerful development tools.
- Multilanguage support.
- Windows® Internet Explorer® Web Browser Control for Windows CE (based on Internet Explorer 6), with a user interface that can be replaced by the automaker.
- Rich multimedia support through the Microsoft® DirectShow® API, with support for a variety of formats such as Windows Media® Audio and MP3.
- High-performance graphics support through the Microsoft® Direct3D® Mobile API and the Microsoft® DirectX® API.

Middleware and Application Cores

The next layers up in the software stack are the Microsoft Auto 3.1–specific middleware and services. These components define the heart of the Microsoft Auto 3.1 platform; they distinguish this platform from standard Windows CE and from the other platforms based on Windows CE technology.

A detailed view of the system building blocks that make up the software platform components for Microsoft Auto 3.1 is shown in Figure 2.

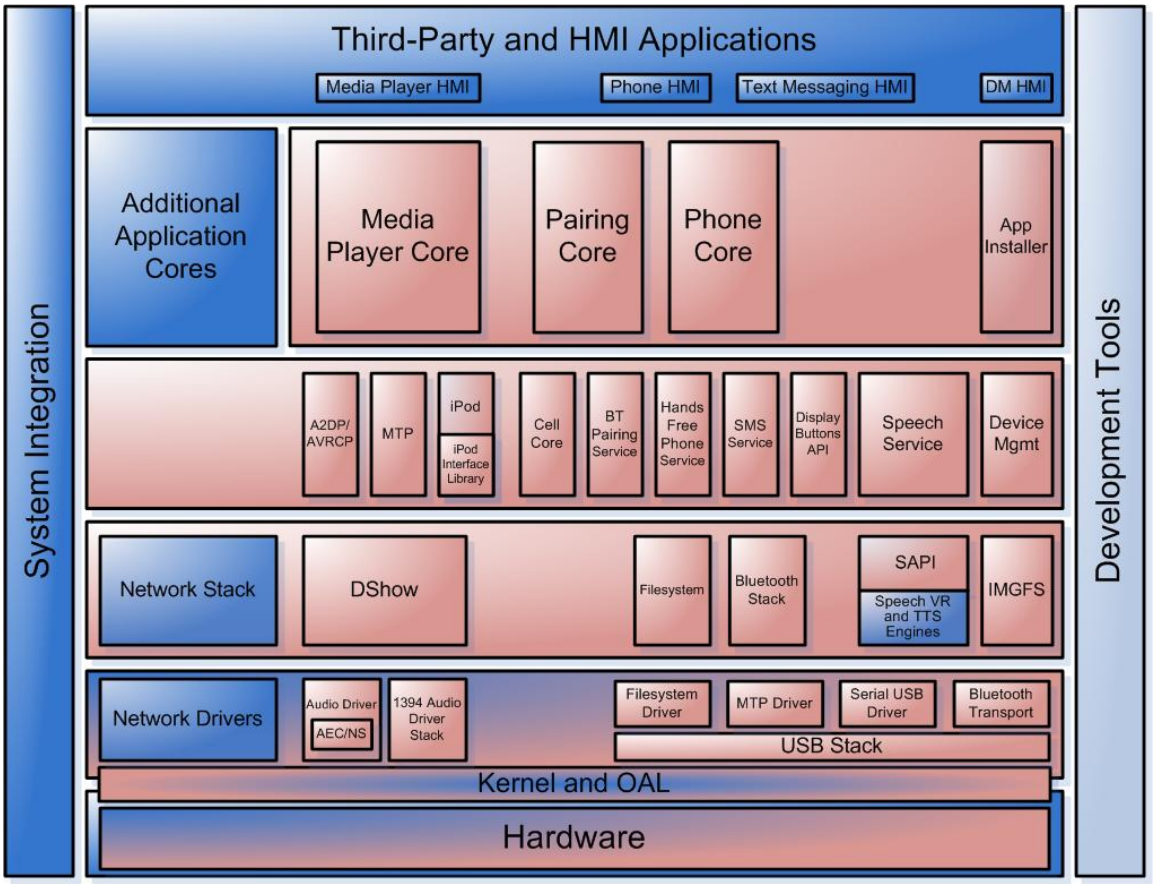

Figure 2 Platform components

The middleware components provide a stable foundation for connectivity and consumer device applications. Additional components adapting the platform to specific requirements (for example, the MOST network stack) can be added by third parties or by suppliers.

The middleware layer provides the infrastructure support required to easily develop applications while using the powerful features exposed by the base platform. Services in this layer include the following:

- **Speech service.** Provides a robust speech API that sits on top of the Microsoft Speech API (SAPI). This lets many applications share the recognition and text-to-speech engines and provides common controls that make it easy for applications to have a rich dialog with the user with minimal application work.

- **Display service.** Provides support for applications that interact with the user through display messages, including both a display driver that supports connections to multiple different types of vehicle displays and a display API that makes it possible for an application to write to the display after a connection to the display is established.
- **Buttons support.** Provides the ability to use buttons that may have different underlying hardware (in different vehicle models) in a uniform way using a notion of virtual keys and key-up and key-down events.

Additional services include vehicle networking and diagnostics services, hands-free mobile phone service, data communication and connection management, and device management service.

Applications written for Microsoft Auto 3.1 can use a broad array of C/C++ APIs. The base Windows Embedded CE 6.0 R2 system exposes an API for its services (including memory and process management, file systems, registry access, and so on). The automotive-specific platform components expose APIs for support of functionality such as vehicle networking, speech, hands-free telephony, and diagnostics.

Bluetooth Wireless Technology

Microsoft Auto 3.1 provides a modular *Bluetooth*® 2.0+EDR–compatible software stack that is built on the Windows Embedded CE 6.0 *Bluetooth®* stack. Deployed Microsoft Auto 3.1–based systems that make use of the Microsoft Auto 3.1 *Bluetooth®* solution may be updated in-field with the device management sub-system. The platform supports a pairing service, hands-free functionality, dial-up networking client, OPP/OBEX, streaming audio using A2DP, and the serial port protocol.

With the *Bluetooth*® wireless technology software stack, devices (such as PDAs and mobile phones) can be paired and connected with Microsoft Auto 3.1 devices. The software stack supports a number of *Bluetooth*® wireless technology profiles used in automotive solutions (including PBAP, A2DP, AVRCP, HFP, and DUN). Windows Embedded CE 6.0 R2 includes additional *Bluetooth*® wireless technology profile implementations that have not been explicitly tested with Microsoft Auto 3.1, but could provide a basis for additional solutions. Appendix 3 provides further information about the Microsoft Auto 3.1 *Bluetooth*® stack.

Bluetooth Pairing Core

The *Bluetooth®* wireless technology pairing core is one of the application cores used to provide core services to Microsoft Auto 3.1 applications; many Microsoft Auto 3.1 applications depend on this API to pair and communicate with *Bluetooth®* wireless technology–enabled devices.

Media Core

With the media core, developers can work with any of the wired device types through a single standard interface, providing the customer with a single experience regardless of the type of wired media device that is connected. The user experience can be driven by buttons on the display or by voice, depending on the requirements of the supplier and automaker.

The media core module is responsible for actual media playback, metadata indexing, hardware event handling (for example, power and speech), keeping all the metadata of all tracks, and maintaining a “now playing” list with history and shuffling ability. All sorting of metadata is done at this level. The media core also supports use of the A2DP and AVRCP *Bluetooth®* profiles to

enable playback of music wirelessly from phones and other devices that support those *Bluetooth®* profiles. The media core adds media capabilities that include:

- **Zune support**. Microsoft Auto 3.1 also offers a software add-on package that lets a device fully interact with all available Zune devices for playback of audio content through a USB connection. The Zune support includes full support for all DRM-protected content purchased through the Zune Marketplace or obtained through the Zune Pass subscription service.
- **MTP device support**. MTP-based devices from companies such as Sansa, Creative, and iRiver are also supported, including the DRM-protected content on those devices. These types of devices are connected via USB.
- **iPod support**. Older generation iPods are supported through 2-wire style connections; newer generation models that require a 1-wire connection with Apple Authentication are also supported. Playback of all audio content (including content protected by the Fairplay DRM mechanisms) is supported, as are the popular iPhone and iPod Touch.
- **Mass storage device support**. The media core supports the ability for a user to bring in digital media that is not DRM-protected into the vehicle on mass storage devices, such as USB storage devices and SD cards.
- **Supported media formats**. The media core can access, index, and play files that are in WMA, MP3, PCM WAV, and AAC formats. The media core also supports playlists, including those in M3U and WPL formats in addition to the native formats supported on iPods and Zunes.
- **Browsing media files**. Regardless of the type of the physically connected device, the media core creates a full index of the audio media on the device based on the metadata included in the digital media files. This helps ensure that the user experience is the same, regardless of the device type attached. The user interface can be driven by a folder-based hierarchy or can be filtered by a variety of available metadata, including track name, album name, artist, and genre. This index is maintained per device by the media core, and the index for each known device can also be persisted (enabling fast access to the same device the next time it is brought into the vehicle).
- **Playback control**. The media core makes it possible to have full playback control over the media files that it has indexed, including play, pause, fast forward, rewind, next track, and previous track.

Phone Core

The phone core provides connectivity and control of mobile phones to make and receive phone calls using the *Bluetooth®* HFP profile. The phone core supports an automatic download of the contact list from the mobile phone. (The user's contact list can be presented either by display in the car or by voice, depending on the application Human-Machine Interface.)

- **Automatic synchronization of contacts**. The phone core can download the phonebook from mobile phones that support the functionality through *Bluetooth®* wireless technology. After the initial phonebook download, the data is persisted on the device, so the user has almost instant access to the information the next time the phone is connected to the device. If new contacts have been added to or deleted from the phone since the last time it was connected to the device, the phone core automatically

downloads the new phonebook in the background while the customer maintains access to the persisted phonebook. Contacts can be automatically downloaded via PBAP, SyncML, or AT commands. The phonebook can also be filled through an OPP/OBEX vCard object that is push-initiated by the user.

- **Extensive call control capabilities**. The phone core lets the application answer incoming calls, dial a new call, switch between calls, hang up calls, and redial the last number called. Support is also provided for call waiting information. The phone core also downloads and makes the mobile phone's call history available, so that the application can expose that information to the customer as well. The device can also send the phone call audio to the handset by toggling the privacy mode of the phone.
- **SMS message support**. The SMS router provides access to the SMS messages that are received by the *Bluetooth®*-connected phone, for those phones that support SMS message access through AT commands.
- **Phone status support.** The phone core supports the ability to get the carrier name, battery level, network state, and signal strength information for those phones that expose that information over *Bluetooth®* wireless technology.
- **Broad handset compatibility.** Microsoft Auto 3.1 regularly ships device compatibility updates, empowering partners to issue updates to their in-car devices that include support for the latest mobility devices available on the market.

Speech Service

Microsoft Auto 3.1 provides a speech-based user interface enabled by the speech service, which can host a variety of SAPI 5.0-compliant speech recognition (SR) and text-to-speech (TTS) engines. The speech service also uses a speech prompt engine, which, when combined with pre-recorded and dynamically synthesized prompts, creates a more natural user experience. The speech engines are interchangeable, providing for inexpensive support for several languages.

The speech service provides a set of intuitive, high-level speech controls designed to enable rapid speech application development for non-SAPI experts. It also performs system-wide speech-related bookkeeping and management services, such as managing the global grammar and arbitrating access to the speech focus.

Language availability is limited only by the speech engine and TTS vendor language catalogs. There are three voice recognition and TTS engine combinations included in Microsoft Auto 3.1 for development purposes only (two sets are from Nuance [Scansoft] for both VR and TTS, another comes with VR from Siemens AG and TTS from SVOX). The supplier and automaker must choose a speech engine vendor and obtain licensing through the vendor for the engines and languages, and must then tune the system before deployment.

GPS

Microsoft Auto 3.1 supports GPS positioning of the vehicle; it then communicates this position to applications that need the information. Microsoft Auto 3.1 uses the Windows Embedded CE 6.0 R2 GPS Intermediate Driver (GPSID) architecture—a developer can create a driver that feeds the GPSID with GPS data (either from a GPS chip onboard the device, GPS available on the vehicle network, a *Bluetooth®* wireless technology connection that is feeding GPS signals, or another source). Since the developer controls the functionality of the source of the GPS data that data can be raw feeds directly from a GPS chip or it can be corrected GPS data based on

dead-reckoning algorithms. The GPSID architecture then offers multiplexed application access to the GPS data through a standard interface at the top edge of the GPSID component.

Connection Manager

The connection manager is the central component for managing connections on the Microsoft Auto 3.1 platform. The connection manager provides an API to let applications request connections, specify priorities, and close connections after use.

A supported connectivity feature is the firewall module. Windows Embedded CE 6.0 R2 brings an integrated firewall module to Microsoft Auto 3.1 that is configured using registry settings; with this module, Microsoft Auto 3.1 is flexible enough to support a wide range of firewall scenarios and applications.

Device Management Sub-System

The device management (DM) sub-system supports mechanisms for updating applications, configuration settings, and system software on Microsoft Auto 3.1 at different stages during its life cycle (see Figure 4). Generally, the device management scenarios that are enabled are determined by the policies of the automaker. The primary goal of DM is to maintain a unified software inventory on the Microsoft Auto 3.1–based device, regardless of the update method.

Supported DM use cases include:

- Installing application software, a complete image, or critical patches and fixes.
- Uninstalling or reinstalling application software.
- Activating or deactivating installed applications.
- Adjusting the user's setup.

The provisioning mechanism in Microsoft Auto 3.1 relies on the download of standard CAB files to the device. There is a standard component available that unpacks, verifies, and installs CAB files; a limited scripting capability makes it possible to modify registry and other device-specific settings. The CAB unpacking mechanism is principally independent of the CAB file contents, so this mechanism could also be used to download installable content for other electronic control units networked to the Microsoft Auto 3.1–based device.

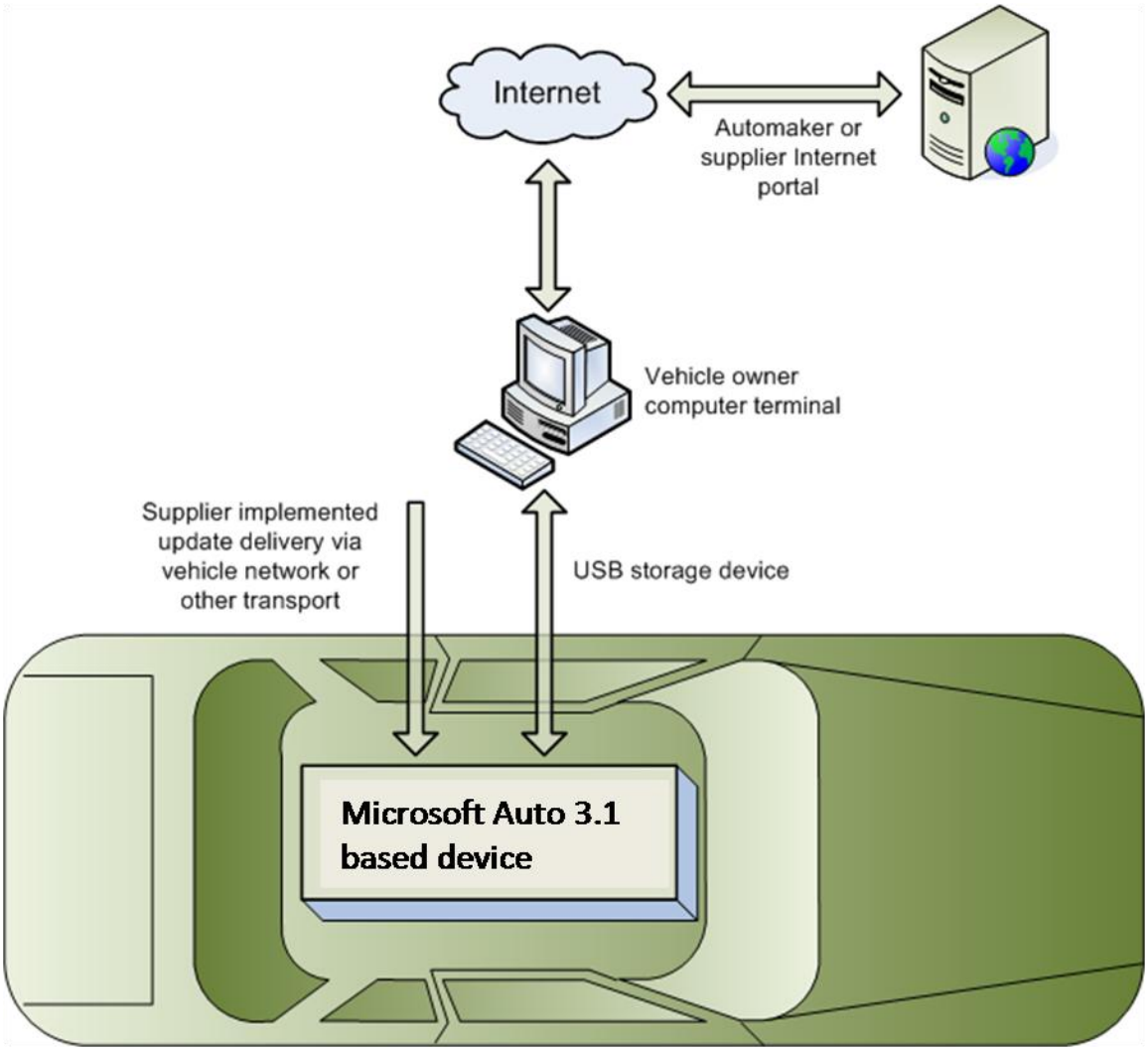

Figure 3 Device management

The overall DM solution in Microsoft Auto 3.0 is primarily based on core Windows Embedded CE DM components, with some enhancements:

- **Single installation API.** A single installation API is used instead of several installer executables. The installation API can handle all types of installation packages. This enables effective reboot handling because information on the installation status can be exchanged more easily, and installation can be paused, stopped, and resumed by using an API instead of an executable file. The API supports compressed CAB files for better bandwidth utilization.
- **Support for unattended uninstall/upgrades.** CAB file uninstallations are, by default, delayed until key-off. This makes uninstallation of an application in use nonintrusive to the customer.
- **Super CAB files.** Super CAB files (PKS) bundle packages together into one larger package. These may involve a set of application CABs or a set of system updates.

The device update process has two steps:

- Obtaining the actual file (the update image) onto the device (delivered on a USB storage device or an alternate delivery method implemented by the supplier).
- Performing the actual update by verifying and extracting the update image and installing.

Suppliers can select whether updates will be obtained from a USB storage device —the correct CABs and INF file is attached to the USB host port and an update is initiated manually—or automatically based on an ignition cycle.

The installer is involved in actual verification and installation. The installer maintains a persistent installation database that can be accessed by other applications and services to determine the software inventory and package installation status. The installer itself is a DLL that exposes an installation API (as opposed to a standalone process).

For system-update packages, the installer triggers the Image Update mechanism. This causes a reboot into the Update Loader (ULDR), which verifies and applies updates to the operating system. Update progress and status is carefully tracked across reboots and reported back to the Installer DB.

Using a centralized installation database to maintain the state of each downloaded package, the DM engine can continue the DM session after a reboot, which is usually delayed until key-off. When the device is turned on again after a reboot, the DM session continues from where it left off.

Security Sub-System

The security sub-system helps to ensure that Microsoft Auto 3.1 does not accept or run untrusted executable code on the system. Microsoft Auto 3.0 is engineered with adherence to the Trustworthy Computing (TwC) security standards enforced at Microsoft. The most critical security mechanism for Microsoft Auto is its application/operating system trust model. Authenticode code signing technology is used to help ensure that Microsoft Auto does not install or run untrusted code.

It is possible to configure the Microsoft Auto 3.1 platform so that all updates to the image (whether they be applications or system updates) must be signed. For each of the different types of updates possible, there are different certificate stores to enforce this policy. Some examples include:

- **Secure Image Download.** At the lowest level, certificates in the secure image downloader ensure that only certain signed images can be used to completely re-flash the system.
- **Operating System Image Updates.** Each of the image update packages has a certificate store (stored in a binary blob called Device Side Manifest [DSM] in the package).
- **Application Installation.** Application CABs are signature verified upon download from the USB storage device. Certificates in the installer policy store determine whether the CAB should be accepted or not.
- **Device Authentication.** A Service Credential object is provided to applications for enabling device authentication.

- **Other Security Mechanisms.** Several additional sub-systems employ mechanisms to help protect against threats that apply to them. For example:
  - *Bluetooth®* wireless technology connection with an external device is made over a secure link.
  - Application CABs can be signed with a flag that prevents their installation from USB storage devices to limit piracy concerns.
  - Diagnostics Security Access is implemented to allow certain operations to be performed only if the client presents the necessary evidence.

To manage certificates and encryption keys on the device, Microsoft Auto 3.1 (through Windows Embedded CE 6.0) provides CryptoAPI.

Reliability Sub-System

Several subcomponents in Microsoft Auto 3.1 provide support for system reliability.

- **Hardware watchdog.** Helps ensure that the system is reset if it appears locked.
- **System health monitoring.** Hosted in SysHealth.exe and contains a launch monitor (helps ensure that the set of applications considered critical for system functionality start up normally), memory monitor (watches currently available memory and schedules a deferred or immediate reboot if it is below a low or critically low threshold), periodic reboot (configurable by the supplier), and RTL_ZONE logging (collects a retail message log for the system).
- **Process monitor.** Provides a timer-based software watchdog; applications can request a process termination or a system reboot if they happen to hang.
- **Reliability service.** Provides the ability to request system reboots and enforces logic for the system to shut down completely if recurrent reboots are detected within a short period of time.
- **Flash driver.** Implements several mechanisms to help ensure a long flash life, including wear-leveling, bad block handling, main and spare-area error correcting codes, and protection against flash sector corruption because of unexpected power failure.
- **Backup installer**. System switches to the backup installer database (DB) upon detection of any kind of corruption in the active DB, the installer switches back to the backup DB.

Whenever the system schedules a planned reboot, it notifies applications through power management events. Planned reboots occur in situations such as installer scheduled reboots (upon application or system updates) and SysHealth reboots. Whenever the system suspends or reboots in a planned manner, it flushes data to the disk. If the system has to reboot because of catastrophic conditions (such as a battery disconnection, a reset from the hardware watchdog, or a critical process failure), it is not possible to notify applications to save data.

Human-Machine Interface Layer

The Microsoft Auto application model enables a clear separation of Human-Machine Interface (HMI) from the core application logic. The HMI framework, technically part of the Windows application framework, facilitates the separation of the HMI portion of the application from the computational or processing portion. This lets the core of the application be written once; the look and feel of the user interface can then be readily customized. The core applications can be updated without change to the HMI, and vice versa.

The supplier or automaker can write applications in the HMI layer that take advantage of the application cores and middleware components. Microsoft Auto 3.1 provides the flexibility to fit into almost any user interface paradigm the automaker may choose—the middleware offers all of the core functionality that lets the supplier present it to the customer in a way that meets the requirements of each individual automaker.

The HMI sample applications included in Microsoft Auto 3.1 include the media player, phone application, device management HMI (for installing applications and image updates from an attached USB storage device), *Bluetooth®* wireless technology pairing application, and SMS reader.

Delivering a Microsoft Auto–Based Solution

Application designers can rely on the rich, familiar development environment provided by Microsoft Auto. For a "future-proof" device, Microsoft Auto uses a secure, standard, and stable update and installation technology from Windows Embedded CE 6.0 R2 and Windows Mobile.

Microsoft Auto supports a powerful API set and provides an intuitive development framework that application developers can use. The toolset and framework are familiar to the general development community (which might not necessarily have automotive software development experience).

Microsoft Auto provides easy access to various ports and peripherals during the development and testing phase—both for system developers and application developers. This includes mechanisms in the hardware and in the software image to enable easy development, download, testing, and debugging of system images and applications. Additionally, Microsoft Auto enables designs to meet requirements from various testing phases, such as unit testing, functional testing, system-integration testing, and in-vehicle integration testing.

The Microsoft Auto 3.1 development tools include:

- Platform Builder 6.0
- Visual Studio 2005
- Development hardware
- Microsoft Auto 3.1 Platform Development Kit

Platform Builder 6.0

Platform Builder is a standard integrated development environment (IDE) for Windows CE–based devices. Platform Builder 6.0 ships with Windows Embedded CE 6.0 R2 and runs as an add-on to Visual Studio 2005—providing a more consistent development experience for both application and platform developers.

Microsoft Auto 3.1 uses Platform Builder 6.0 primarily for the following scenarios:

- Developing (edit, compile, debug) of native C and C++ code on the platform.
- Flashing a development board with new software images.
- Monitoring the debug trace output from a running system.
- Using remote tools to measure and monitor various parameters of the device.
- Executing some automated tests of the device.

Visual Studio 2005

Visual Studio 2005, the standard development suite for desktop Windows development, features an extensive set of tools, configuration samples, and guidelines that improve productivity from the initial design to final testing and tuning.

Visual Studio 2005 is required for hosting Platform Builder 6.0. Using the Platform Builder mode, the developer can create and debug the actual operating system platform on which the HMI applications will run. Using Visual Studio in application mode enables development and debugging of applications running on top of the platform image already running on the device.

Development Hardware

The development and testing for Microsoft Auto is typically done on prototype hardware rather than through software emulators. The development hardware should have available either a serial port and a USB device or an Ethernet port for connecting to a desktop computer. Microsoft Auto 3.1 does provide a development hardware reference design—details are given in Appendix 2.

Platform Development Kit

Microsoft Auto 3.1 ships as a Platform Development Kit (PDK) that installs on top of Windows Embedded CE 6.0 R2; it is used in conjunction with Visual Studio 2005 and Platform Builder 6.0 for development of the complete software stack for a specific device. The Microsoft Auto 3.1 PDK includes source code and binaries for the two supported processor platforms (MARPF1 and TI Jacinto EVM Board), binaries for the Microsoft Auto middleware components, documentation, and the command-lines tools necessary to create, modify, and extend a Microsoft Auto 3.1–based device image.

Summary

Microsoft Auto provides a proven, reliable, and extensible software platform and development hardware reference design on which automakers can distinguish themselves by building innovative solutions to help drive sales and customer loyalty. It provides automakers, suppliers, and developers with the building blocks they need to quickly and reliably create a broad range of advanced in-vehicle solutions that meet the growing needs of automotive consumers and set them apart from the rest of the field. Integrated features such as *Bluetooth®* wireless technology, speech recognition, and media player support are built into the platform for rapid deployment without heavy development time. Application designers can use the comprehensive software solution that is provided, or they can easily extend Microsoft Auto to their own unique implementation. Developers may also reuse existing, proven software components, freeing up development resources and saving design cycles. The Microsoft Auto platform is modular, so developers can use the components they wish and exclude or substitute others—from the development hardware reference to any of the middleware components. The development hardware reference design, along with robust software tools, also results in faster time-to-market. Many software components can be reused across product lines and models, saving time and money.

Microsoft Auto provides:

- A reliable, robust platform.
- Increased productivity and reduced costs.
- Flexibility, scalability, and extensibility.

Reliable, Robust Platform

With support for industry-specific hardware and software, Microsoft Auto provides a reliable, high-quality platform. Microsoft Auto uses the familiar WIN32 API set that contains a powerful interactive developer environment that meets a wealth of automotive-relevant requirements. The Windows CE 6.0 core is reliable, extensively tested and widely used—this provides the foundation and tools for quickly and reliably creating a broad range of extensible, customizable, and advanced in-vehicle solutions.

Increased Productivity and Reduced Costs

Microsoft Auto enables automakers and suppliers to develop their infotainment solutions with fewer design cycles and get them into production more quickly. Microsoft Auto uses a comprehensive middleware stack, eliminating the need for additional hardware and removing the inefficiencies of creating ad hoc software solutions; the result is faster, less expensive and more reliable integration.

Flexible, Scalable, and Extensible

Automakers and suppliers can help ensure that their systems stay current with the latest devices and services, thanks to the inherently flexible design and built-in software update mechanisms of Microsoft Auto. Unique solutions and customized user interfaces can also be easily built on top of the existing platform. The open architecture is designed specifically to enable a designer to easily extend functionality with custom solutions.

Glossary

A2DP

Advanced Audio Distribution Profile. A2DP defines how high quality audio (stereo or mono) can be streamed from one device to another over a *Bluetooth®* wireless technology connection.

AAC

Advanced Audio Coding. AAC is a standardized, lossy compression and encoding scheme for digital audio that is designed to be the successor of the MP3 format. AAC generally achieves better sound quality than MP3 at many bit-rates.

API

Application Programming Interface. An API is a source code interface that an operating system or library provides to support requests for services to be made of it by computer programs.

ARM

Advanced RISC Machine or Acorn RISC Machine. ARM is a 32-bit RISC processor architecture that is widely used in many embedded designs. Their power-saving features make ARM CPUs dominant in the mobile electronics market, where low power consumption is critical.

ASX

Advanced Stream Redirector. One of the three Windows Media metafile formats (ASX, WAX, and WVX). The ASX file is a metafile (a file that contains data about another file) a reference to an ASF file.

AT commands

The Hayes command set, also called the AT (for attention) command set, is used by dial-up modems. The command set consists of a series of short strings that combine together to produce complete commands for operations such as dialing, hanging up, and changing the parameters of the connection.

AVRCP

Audio/Video Remote Control Profile. AVRCP is designed to provide a standard interface to control devices to let a single remote control to control all of the audio/visual equipment to which a user has access.

Binary blob

Binary Large Object. A binary blob is an object file that is loaded into the kernel of an open source operating system (not usually code running outside the kernel such as BIOS).

Bluetooth® wireless technology

An industrial specification for wireless personal area networks, named after the 10th century king of Denmark, King Harold Bluetooth. *Bluetooth®* enables connection and information exchange between devices such as mobile phones, laptops, personal computers, printers, digital cameras, and video game consoles over a secure, globally unlicensed short-range radio frequency.

Bluetooth® 2.0+EDR version introduced an Enhanced Data Rate (EDR) of 3.0 Mbit/s (basic signaling rate, the practical data transfer rate is 2.1 Mbit/s).

Boot loader

A program whose only job is to load software to start the operating system.

BSP – Board Support Package

A Board Support Package refers to the software components that sit between the Operating System and the actual hardware. These are software drivers for the hardware and also typically refer to the software which runs upon the initial boot sequence of the hardware.

CAB file format

The Microsoft Windows native compressed archive format. It supports compression and digital signing, and is used in a variety of Microsoft installation engines, including Setup API, Device Installer, AdvPack (for the installation of ActiveX components from Internet Explorer) and Windows Installer).

Codec

A device or program capable of encoding and decoding a digital data stream or signal. Microsoft Auto 3.0 only provides production-licensed decoders for Windows Media Audio (WMA) and a development license for MP3.

CAN

Controller Area Network. CAN is a computer network protocol and bus standard designed to enable microcontrollers (microprocessor designed for high integration, low power consumption, self-sufficiency, and cost-effectiveness, in contrast to a general-purpose microprocessor) and devices to communicate with each other and without a host computer.

CryptoAPI

Cryptographic Application Programming Interface. An API included with Windows operating systems that provides services so that developers can secure Windows-based applications using cryptography. It is a set of DLLs that provides an abstraction layer that isolates programmers from the code used to encrypt the data.

DirectShow

A multimedia framework/API produced by Microsoft. DirectShow can be used by software developers to perform various operations with media files or stream; DirectShow is based on the Windows Component Object Model (COM) framework and provides a common interface for media across many programming languages. It is an extensible, filter-based framework that can render or record media files on demand.

DirectX

A collection of APIs for handling tasks related to multimedia, especially game programming and video, on Microsoft platforms.

DLL

Dynamic-Link Library. DLLs are implementations of the shared library concept in the Microsoft Windows and OS/2 operating systems, and they have the file extension DLL, OCX (for libraries containing ActiveX controls), or DRV (for earlier system drivers). DLLs can contain code, data, and resources, in any combination.

DMA

Direct Memory Access. DMA enables hardware sub-systems within the computer to access system memory for reading/writing independently of the central processing unit. Many hardware systems use DMA, including disk drive controllers, graphics cards, network cards, and sound cards. DMA channels can transfer data to and from devices with much less CPU overhead.

DRAM

Dynamic Random Access Memory. DRAM is a type of random access memory (RAM) that stores each bit of data in a separate capacitor within an integrated circuit. The capacitor charge is refreshed periodically, as opposed to static memory.

DRM

Digital Rights Management. DRM refers to the access control technologies used by publishers and copyright holders to limit usage of digital media or devices.

DUN

Dial-Up Networking Profile. DUN provides a standard to access the Internet and other dial-up services over *Bluetooth®* wireless technology. DUN can be used to access the Internet from a laptop by dialing up wirelessly on a mobile phone.

Executable

A file whose contents are meant to be interpreted as a program by a computer.

FairPlay

A digital rights management (DRM) technology created by Apple Inc.

FAT

File Allocation Table. FAT is the primary file system for various operating systems. A TFAT is a Transaction Safe FAT.

FIR

Finite Impulse Response filter. A FIR filter is a type of a digital filter, an electronic filter that works by performing digital mathematical operations on an intermediate form of a signal (in contrast to older analog filters).

Flash memory

Non-volatile computer memory that can be electrically erased and reprogrammed.

FPGA

Field-Programmable Gate Array. An FPGA is a semiconductor containing programmable logic components (logic blocks) and programmable interconnects.

Gateway

A computer or a network that enables or controls access to another computer or network.

GDI

Graphics Device Interface. GDI is one of the three core sub-systems (along with the kernel and the Windows API for the user interface of Microsoft Windows). GDI is an interface for representing graphical objects and transmitting them to output devices.

GOEP

Generic Object Exchange Profile. The GOEP provides a basis for other data profiles, and is based on OBEX.

GPIO

General Purpose Input/Output. GPIO devices provide a set of IO ports that can be configured for either input or output.

GPS

Global Positioning System. GPS utilizes at least 24 satellites that transmit precise microwave signals, enabling a GPS receiver to determine its location, speed, direction, and time.

Head unit

A component of a stereo system, either in a vehicle or in a home cinema system, that provides a unified hardware interface for the various components of an electronic media system.

HFP

Hands-Free Profile. HFP is commonly used to enable auto hands-free kits to communicate with mobile phones in the car.

HMI

Human Machine Interface.

JTAG

Joint Test Action Group. JTAG refers to the IEEE 1149.1 standard for test access ports that are used for testing printed circuit boards using boundary scan.

Kernel

The central component of computer operating systems, which manages the system resources (communication between hardware and software components).

M3U

Moving Picture Experts Group Audio Layer 3 Uniform Resource Locator (also MP3 URL). M3U is a computer file format that stores multimedia playlists.

Middleware

Computer software that connects software components or applications. Middleware consists services that enable multiple processes running on one or more computers to interact across a network.

MOST

Media Oriented System Transport. MOST is a serial communication system for transmitting audio, video and control data through fiber-optic cables. This multifunctional, high-performance multimedia network technology based on synchronous data communication requires professional software tools and hardware interfaces.

MP3

MPEG-1 Audio Layer 3. MP3 is a digital audio encoding format used to create a file to store a single segment of audio so that it can be organized or easily transferred between computers and other.

MPEG

Moving Picture Experts Group. MPEG, is a working group of the International Organization for Standardization/International Electrotechnical Commission charged with the development of video and audio encoding standards. MPEG has standardized compression formats and ancillary standards.

MTP

Media Transfer Protocol. MTP is a set of custom extensions to the Picture Transfer Protocol (PTP) from Microsoft. MTP supports the transfer of music files on digital audio players and movie files on portable media players. MTP is closely related to Windows Media Player.

NAND flash memory

Forms the core of the removable USB interface storage devices (USB storage devices) and most memory card formats.

OBEX

OBject Exchange. OBEX is a communications protocol that facilitates the exchange of binary objects between devices. Many PDAs use OBEX to exchange business cards, data, even applications.

OPP

Object Push Profile. OPP defines the requirements for the protocols and procedures to be used by the applications involved in the pushing/pulling of data objects between *Bluetooth®* devices.

PBAP

Phone Book Access Profile. PBAP enables the exchange of Phone Book Objects between devices. It can be used between a car kit and a mobile phone to let the car kit display the name of the incoming caller.

PCM

A term for data encoded as Linear Pulse Code Modulation (LPCM). LPCM is a method of encoding audio information digitally or formats using this method of encoding.

PDA

Personal Digital Assistant. PDAs are handheld (or palmtop) computers. Newer PDAs also have both color screens and audio capabilities, enabling them to be used as mobile phones (smartphones), Web browsers, or portable media players.

PDK

Platform Development Kit. Refers to a collection of tools, documentation, and code that enables a platform developer (likely a supplier) to create, extend, and customize an image for the device. Platform developers have access to all low-level operating system and device-hardware-specific APIs, in addition to application-level public APIs. Platform developers can write new device drivers and modify an image in order to support new hardware.

PMP

Portable Multimedia Player. PMPs are consumer electronics devices that are capable of storing and playing digital media. The data is typically stored on a hard drive, microdrive, or flash memory. Mobile phones are also sometimes referred as PMPs because of their playback capabilities.

PWM module

Pulse Width Modulation module. The purpose of the PWM module is to enable time-critical waveform operations to be handled by the hardware instead of software.

SAPI

Speech Application Programming Interface. SAPI is an API developed by Microsoft to enable the use of speech recognition (converts spoken words to machine-readable input) and speech synthesis (the artificial production of human speech) within Windows applications.

SD card

Secure Digital (SD) card. An SD card is a flash (non-volatile) memory card format developed by Matsushita, SanDisk and Toshiba. SD cards are used in portable devices such as digital cameras, handheld computers, PDAs, mobile phones, and GPS units.

SDIO

Secure Digital Input Output. Devices that support SDIO (typically PDAs, laptops or mobile phones) can use small devices designed for the SD form factor, such as GPS receivers, Wi-Fi or Bluetooth adapters, modems, Ethernet adapters, or other mass storage media such as hard drives.

SDP

Service Discovery Profile. SDPs are network protocols that enable automatic detection of devices and services offered by the devices on a computer network. (For example, the *Bluetooth®* SDP is a profile used to find out which Bluetooth services are offered by the remote device.)

SMS

Short Message Service. SMS is a communications protocol that enables the interchange of short text messages between mobile telephone devices. SMS technology has facilitated the development and growth of text messaging.

SPP

Serial Port Profile. The SPP emulates a serial cable in order to provide an easily implemented wireless replacement for existing RS-232-based serial communications applications, such as familiar control signals. It provides the basis for other profiles such as DUN, FAX, HSP and AVRCP profiles.

SSI

Server Side Includes. SSI is a simple server-side scripting language used for the Web primarily for dynamically including the contents of one file into another file that is served by a Web server.

SyncML

Synchronization Markup Language. SyncML is a platform-independent information synchronization standard.

UART

Universal Asynchronous Receiver/Transmitter. UART is computer hardware component (an individual or a part of an integrated circuit) that translates data between parallel and serial forms. UARTs are now commonly included in microcontrollers.

USB

Universal Serial Bus. USB is a serial bus standard for interface devices, designed to both enable peripherals to be connected using a single standardized interface socket and to improve plug-and-play capabilities by letting devices be connected and disconnected without rebooting the computer (called hot swapping).

vCard

A file format standard for electronic business cards.

Wi-Fi

Wireless Fidelity. A wireless technology that promotes standards for the interoperability of wireless local area network products based on the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standards. Common applications for Wi-Fi include Internet and VoIP phone access, gaming, and network connectivity for consumer electronics.

WAV

Waveform Audio Format. A Microsoft and IBM audio file format standard for storing an audio bitstream on a computer. It is a variation of the RIFF (Resource Interchange File Format, a generic meta-format for storing data in tagged chunks) bitstream format method for storing data in “chunks”, and is the main format used on Windows for raw and typically uncompressed audio. The default bitstream encoding is the Microsoft Pulse Code Modulation (LPCM) format.

Win32API

Windows API. WinAPI is the core set of application programming interfaces (APIs) available in the Windows operating systems—Win32 is the 32-bit API. The API consists of functions implemented in system DLLs (kernel32.dll, user32.dll, and gdi32.dll).

Windows Embedded CE

A Windows operating system developed for embedded systems. Windows CE has a distinctly different kernel, not a trimmed-down version of desktop Windows (it should not be confused with Windows XP Embedded, which is based on Microsoft® Windows NT®). Windows Embedded CE 6.0 is supported on Intel x86 (and compatible processors), MIPS, ARM, and Hitachi SuperH processors. Microsoft Auto 3.0 only ships with support for two ARM-based processors.

WMA

Windows Media Audio. WMA is an audio data compression technology developed by Microsoft as part of the Windows Media framework. WMA can refer to the audio file format or its audio codecs.

WPL

Windows Media Player Playlist. WPL is a computer file format that stores multimedia playlists.

Appendix 1: Microsoft Automotive Business Unit

Microsoft created the Microsoft Automotive Business Unit (ABU) in 1995 in response to the growing desire of consumers to remain connected to their information and entertainment while traveling in their cars. The ABU—a multidisciplinary group composed of product developers and business leaders in North America, Japan, and Germany—is a dedicated partner to the automotive industry. The ABU provides innovative technologies and flexible software to help deliver reliable, easy-to-implement, and cost-effective in-car infotainment solutions that can help automakers and suppliers distinguish themselves in the marketplace.

Appendix 2: Development hardware reference Design

The following table provides details of the Microsoft Auto 3.1 development hardware reference design.

The development hardware reference design recommends using 256 MB NAND flash memory to store the operating system image, the applications, the speech engines, and additional application data. The image is partitioned during build time into an IMAGEFS (Image File System) region and one or more TFAT (Transaction Safe FAT) regions. The lower region of the NAND flash holds the IPL (Initial Program Loader), UPL (Update Loader), device parameter store and FPGA configuration modules. The IPL is only updateable via JTAG programming. The Secure JTAG feature of the CPU prevents unauthorized access to this region.

Function	Characteristics

Processor	• Freescale i.MX31, 16/32 bit RISC microprocessor.
	• ARM1136FJ-S core
	• 90 nm CMOS technology
	• Multi Layer 6*5 AHB Smart Speed Crossbar Switch allowing up to 5 bus transactions in parallel
	• Separate 16kB instruction and 16kB data cache
	• 128K second level cache
	• Smart Power Management
	• Enables simultaneous MPEG4 (SP) encoding and decoding
	• Support for real-time video decode
	  • MPEG4 SP (simple profile)
	  • H.264
	  • WMV
	  • RV
	  • MPEG2
	  • DivX
	• Video and image data pre/post-processing support in hardware
	• 400 (533) MHz CPU clock, SDRAM bus at 100 (133)MHz, DDR at 200 (266) MHz
	• 2-D/3-D graphics support (i.MX31 only)
	• Camera Sensor support
	• High-speed USB 2.0 interface:
	  • OTG – high speed
	  • Host1 – high speed
	  • Host2 – full speed
	• Flexible Audio Interconnect Module allows for programmed flexible connection of the various audio ports (I2S)
	• Security Features
	  • Memory Management Unit
	  • Security Controller incl. Secure RAM and Security Monitor
	  • Random Number Generator Accelerator
	  • Secure JTAG controller (with optional disabling)
	  • Universal Unique Identification
	  • Real-time Integrity Checker
	  • High Assurance Boot
	  • Tamper detection
	• Enhanced DMA
	• Timers

	• Real-time clock • Enhanced Periodic Interrupt Timers • General Purpose Timer • Watchdog Timer • PWM Module • I2C • 2 SSI's • 3 CSPI's • 5-ch UART • FIR Module • GPIO
Memory	• 256 MB NAND Flash 8/16 bit • 64MByte DDRAM
CAN	• The CAN controllers can be connected to a vehicle CPU that in turn is connected to the main CPU by a serial connection
Ethernet	• 100Mbs Ethernet port for fast connection to development environment or other purposes
USB 2.0 OTG port	• High-speed (480 Mbs) USB 2.0 port available for both device and host connections (On The Go)
USB 2.0 Host port	• High-speed (480 Mbs) USB port available for external E-Call module connection and (with additional USB 2.0 hub) connection to future extension modules • Optional replaceable by a RS485 UART connection
USB Full speed port	• Full-speed (12 Mbs) USB port for connection to the *Bluetooth®* 2.0 EDR module
Bluetooth	• *Bluetooth®* 2.0 compatible • Supports Enhanced Data Rate (EDR) • Connection to processor through USB
Wireless 802.11 module	• Optional 802.11 module can be connected to CPU SDIO port

Appendix 3: Bluetooth Software Stack

The Microsoft *Bluetooth®* wireless technology stack implementation is a modular, general-purpose software stack; it is linked by default, or modularized, to meet the specific configurations that an automaker needs. The protocol stack makes up the core portion of the *Bluetooth®* wireless technology implementation. Through a *Bluetooth®* wireless technology connection, devices can exchange data and interact with one another via the applications. The HCI software module supports various connections (UART, USB, and PCMCIA) to the *Bluetooth®* wireless technology chip.

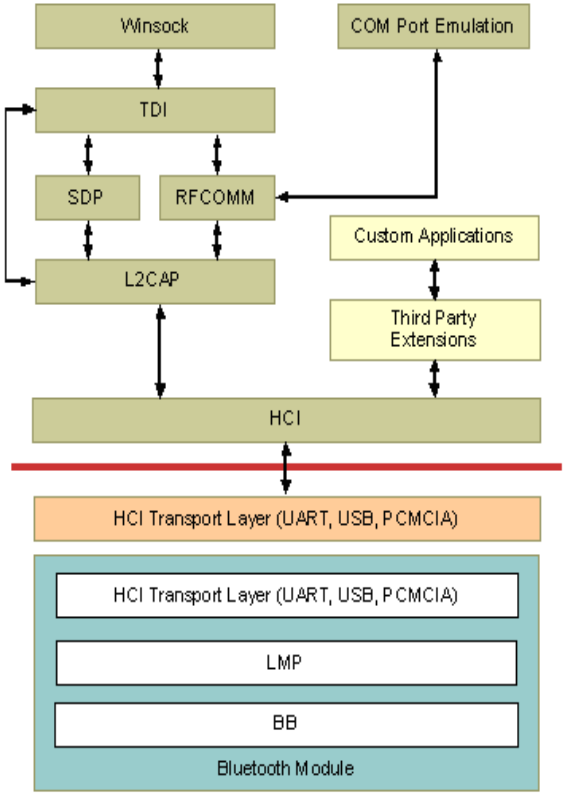

Figure 4 Bluetooth stack

The pairing service provides *Bluetooth®* SDP (Service Discovery Protocol), security, and pairing functionality to Microsoft Auto applications. Paired data is stored in the registry. Events fired by this service serve as notifications of pairings to subscribed applications.

The following profiles/protocols are supported and used in Microsoft Auto 3.1:

- Generic Object Exchange 1.1
- Serial Port Profile 1.1
- Phonebook Access Profile-PCE 1.0
- A2DP-SNK 1.0
- AVRCP-Controller 1.0
- HFP-HF 1.5 (backward compatible to HFP 1.0)

Related Links

The following Web pages provide additional information:

For more information about Microsoft Auto 3.1, see:
http://www.microsoft.com/auto

For more information about the Automotive Business Unit, see:
http://www.microsoft.com/windowsautomotive/default.mspx

To order a development board, visit:

www.msautokit.com